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WPS 37950

MARCH, 1986

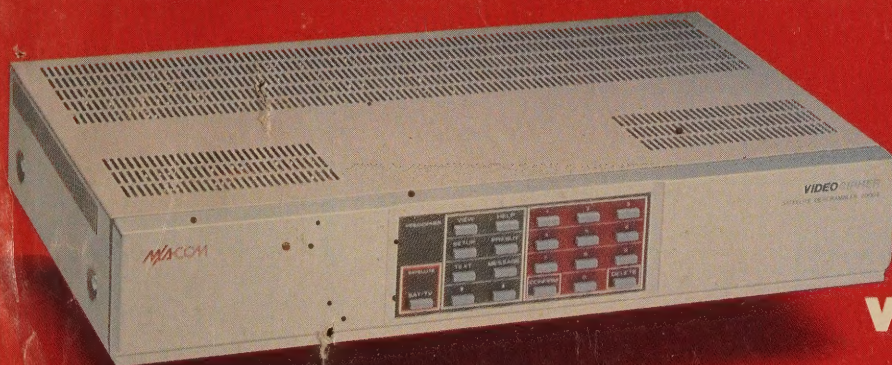
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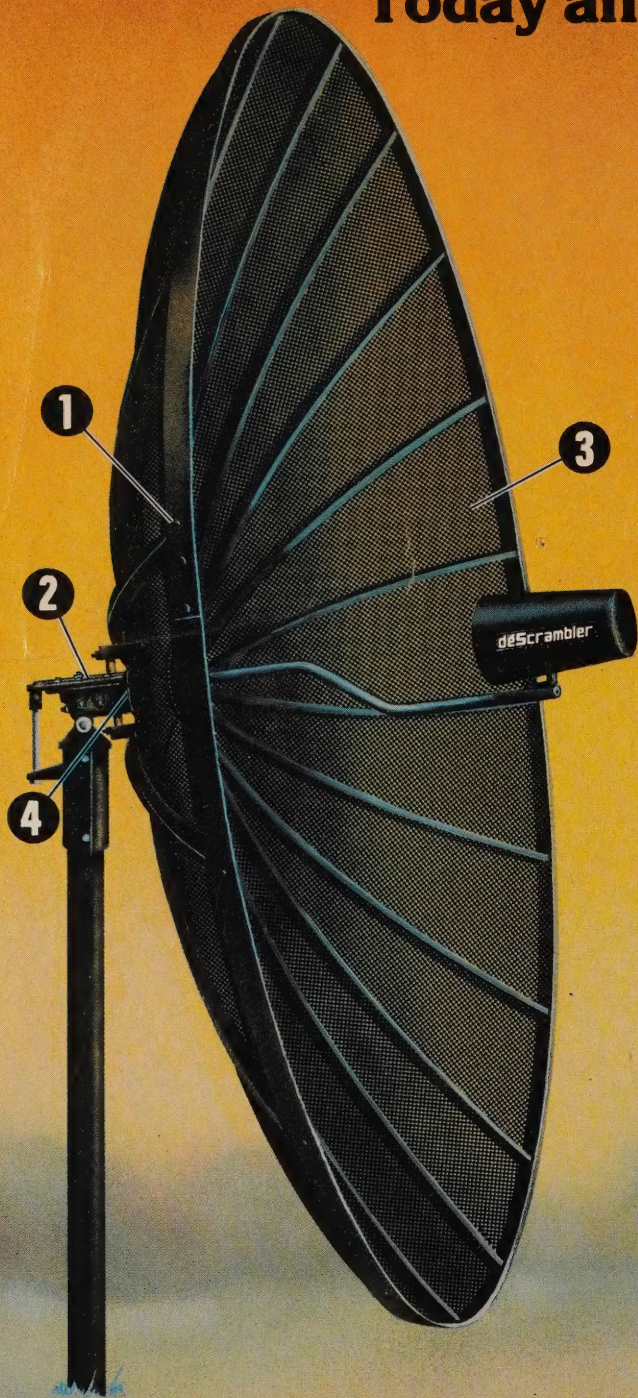
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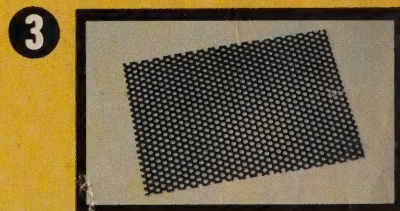


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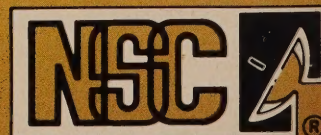


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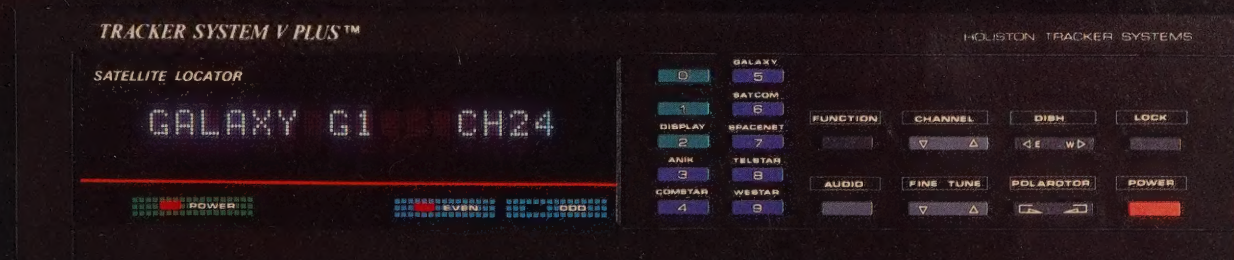
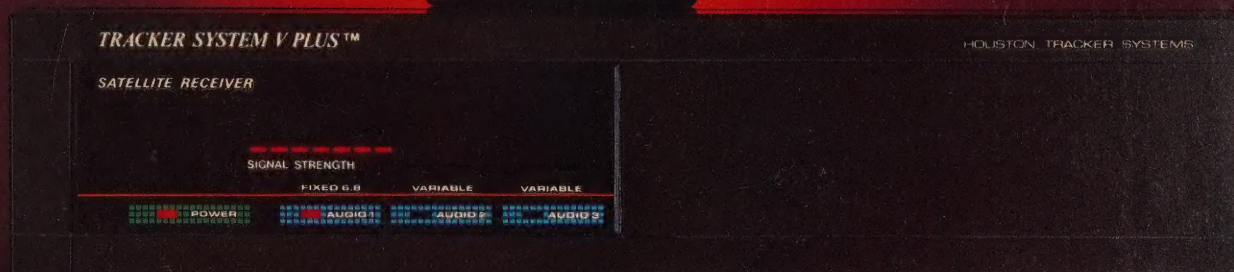
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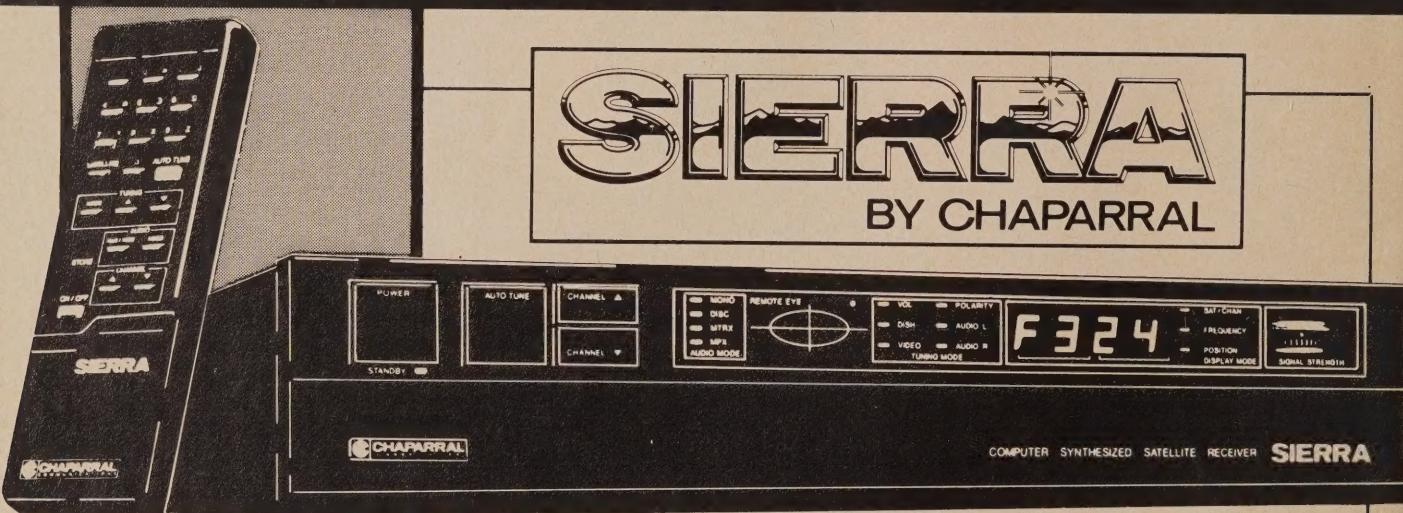


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# Home Satellite TV

VOLUME 2, NUMBER 2

The Magazine of Total Television

MAR, 1986

## The Threat Of SCRAMBLING

16

*The battle for ultimate control of the satellites*  
by Bob Cooper, Jr.

## Earth Station Day

24

*The dishes descend on Washington, D.C.*  
by Ben Harry

## WAVE of the FUTURE

28

*Why everyone will have a satellite TV dish.*  
by Bob Wolenik

## Spinning A Dish

30

*What it takes to form a large antenna.*

## Mobile TVRO

39

*Opening the world to mobile homes and trailers.*  
by Scott Mehno

## Ins And Outs Of ACTUATORS

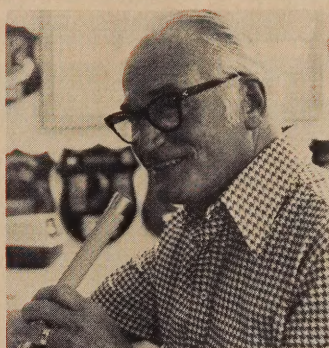
44

*The mechanism that controls dish positioning*  
by Tim Olin

## UPLINK!

50

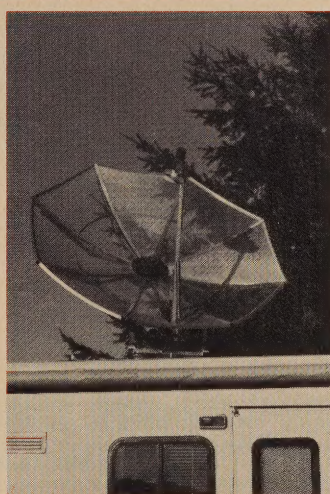
*A look at the other end of the satellite connection.*  
by Jim Vines



## Dish Owner GOLDWATER

*One of our best friends is a TVRO enthusiast.*

32



## PORTABLE Satellite Dishes

*How you can take all the TV channels anywhere.*  
by Tim Harrington

34

## Battling CITY HALL

54

*What it takes to overcome senseless zoning laws.*  
by Michael J. Fennell

## DISH IN HIDING

56

*He found a way to put his dish in the patio*  
by Philip Patterson

## TV AT THE OUTER LIMITS

59

*Bringing satellite wonders to the arctic circle*  
by Jim Vines

## Satellite SPORTS BAR

64

*The main event is always tuned in*  
by Dave Sheldon

## A Giant Tunes In

67

*Massive AMWAY is selling satellites*

## SURROUND SOUND

68

*How to capture the great audio of TVRO*  
by Tim Harrington

## TURNER Aims At Europe

74

*Ted takes American programming abroad*  
by Peter Sutro

## THE HOME SATELLITE STORY

78

*A quick course in TV Receive Only*

**Satellites and the Law**  
**Bringing Sense To Zoning**

by Richard L. Brown 8

**Coop's World of Satellites**  
**How Strong Are Dishes?**

by Bob Cooper, Jr. 10

**System Maintenance**  
**Avoiding Local Interference**

by Dave Sheldon 47

**Sports On Satellite**  
**The Jockey's Earth Station**

by Larry Stewart 72



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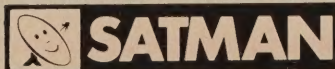
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# Home Satellite TV

## WHY DO YOU WANT A HOME SATELLITE SYSTEM?

Our offices are constantly receiving calls asking for information on home satellite systems. When possible, I try to speak personally with the caller. While I can't, for obvious reasons, offer equipment recommendations, I can sometimes help out with general questions. Answering the calls also helps me to get closer to the needs and concerns of our readers.

Callers almost always begin by explaining *why* they are considering the purchase of a home satellite system. I've been keeping an unofficial tally of the reasons they give. As of right now, more than 50 percent state they are buying systems to get more sports coverage—they want to see *all* of their favorite football, basketball or baseball team's games.

"Right on" is my gut reaction! However, my unofficial survey doesn't jibe with an "official" one conducted this year by Ruddick Research International. They polled over 2,000 home satellite receiver owners (most of whom had purchased within the previous 12 months) and discovered that only 3.5 percent bought because they wanted to get more sports!

Over 60 percent bought because they wanted more channels and greater variety. The next largest group was 13.6 percent who wanted better reception.

The "official" poll was a complete surprise to me.

Who's right? I don't know, but after awhile, I stopped worrying about it. After all, regardless of why you buy, it's getting what you want that counts. I've also been tracking owners who called and were satisfied. My little survey indicated a 90 percent rate of satisfaction. In this case the "official" poll came up with the exact same figure!

Right on!

*Bob Wolenik*  
Editor

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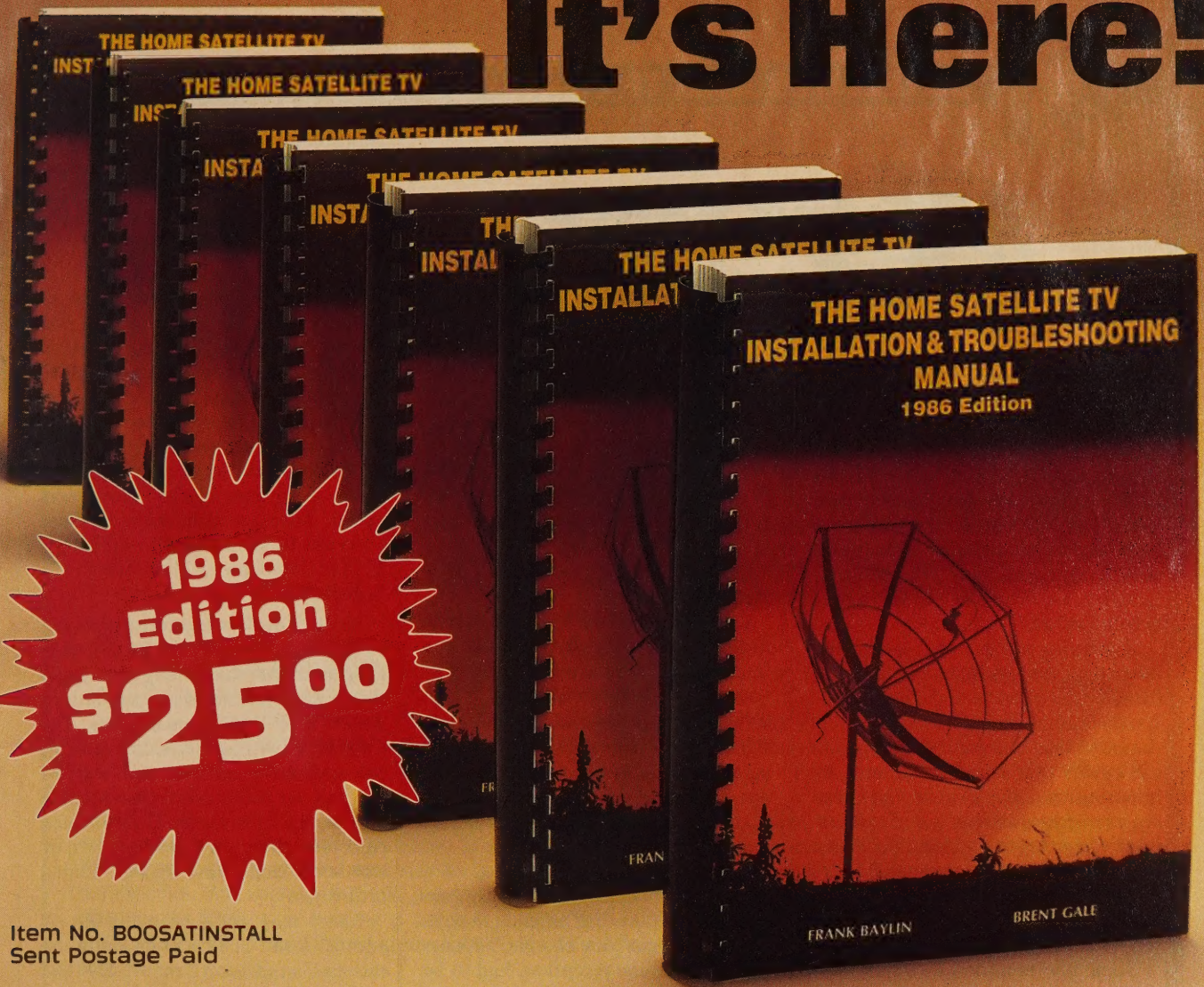
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reference tool you'll reach for time and again. The appendices contain a basic satellite finding program, a complete array of satellite TV equations for computing gain, declination, VSWR, wind loading, etc., plus additional reference listings. The two co-authors are satellite communications specialists whose combined technical experience spans approximately 20 years, and they've presented the information in a clear, easily readable style. Let this complete guide from Long's prepare you to meet any challenge in the exciting satellite TV industry!

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# Bringing Sense To Zoning

**W**e continue to receive scores of letters and telephone calls each week from dish-owning consumers faced with one of the more persistent and perplexing problems we have encountered—local zoning laws that attempt to restrict or prohibit the installation and operation of workable satellite dish antennas. Recent signs, however, are that substantial progress is being made.

A growing number of communities have accepted suggestions from SPACE (Society For Private And Commercial Earthstations) and have adopted ordinances that recognize the reception difficulties that would be created by imposing restrictive location and screen requirements and that avoid subjecting dish owners to discriminatory fees, costs or red tape requirements that are not imposed upon the owners of physically similar devices (such as swing sets).

Some communities, however, continue to maintain ordinances that expressly or effectively prevent the installation and maintenance of usable dish antennas. Puyallup, Washington, for example, has an ordinance that requires satellite antennas to be set back from all property lines at least 10 feet for each foot of dish diameter. This means that a consumer wishing to install a 10 foot dish would have to maintain a lot close to one acre in size devoted exclusively to this purpose. For all practical purposes, this amounts to a ban on dishes. Some communities continue to ban dish antenna installations outright. Other communities purport to allow antennas, but impose restrictions that make their installation and operation impossible. These restrictions usually take the form of height limitations (such as Baltimore's height limit of 6 feet), diameter restrictions (such as Coln township, Pennsylvania's diameter limit of three feet), location requirements (such as a require-

ment that dishes be installed in rear yards only) or screen requirements (such as a requirement that an antenna be totally screened from view).

A recent court decision handed down in the State of Michigan may help consumers encountering local zoning laws or restrictions making it difficult or impossible to install workable satellite dish antennas.

Canton Township, Michigan has an ordinance that Township officials have interpreted as requiring homeowners on corner lots to maintain a 25-foot setback of "open space" from the side street. The officials maintained that a satellite dish antenna would be considered a "structure" and would not be allowed in the required "open space" area.

Antoinette Benner, who lives on a corner lot in Canton Township, acquired a satellite dish antenna that, in order to obtain "line of sight" and acceptable satellite reception, had to be installed in her side yard at a location about 15 feet behind a six-foot hedge abutting her sidewalk. Although the officials conceded that Ms. Benner's six-foot hedge was not a "structure," they insisted that the antenna would have to be moved back to satisfy the open space requirement—a requirement Ms. Benner could not meet and still receive usable satellite signals.

A lawsuit by the Township against Ms. Benner quickly followed. On September 26, 1985, Ms. Benner's rights were vindicated when District Judge John E. MacDonald dismissed the Township's complaint. "Regulation of satellite dish antennas...involves First Amendment rights that typically are not a consideration in determining the validity of zoning ordinances," the Court noted. "As a consequence, the Court has the duty to strictly scrutinize and insure that the asserted state interest is achieved by the least restrictive means." Finding that the Town-

ship's position would effectively prevent Ms. Benner from operating a workable satellite system, the Court concluded that the ordinance could not be enforced against her:

Because satellite dish antennas provide users with the unique ability to receive scores of programming services, some of which are not available through any other means, an ordinance severely restricting or effectively banning dish antennas would leave consumers with inadequate means of receiving these services. In this context, an argument that consumers could have access to some of these services by subscribing to cable television companies will not justify the restriction.

Satellite dealers and consumers, led by the trade association SPACE, have long contended that zoning ordinances that prevent satellite dish installations violate First Amendment rights. The Canton Township decision confirms this contention and evidences a growing judicial recognition that satellite viewing is a constitutionally protected right that cannot be trampled upon by restrictive and short-sighted zoning ordinances.

Relief may soon be available on another front. The Federal Communications Commission is reportedly close to final adoption of a rule that, we hope, will override or "preempt" many restrictive and discriminatory zoning ordinances. On April 1, 1985, the Commission, acting upon a petition filed by SPACE, proposed a rule that would preempt ordinances that discriminate against satellite dish antennas and that are not the "least restrictive" method available to advance valid governmental objectives. The Commission called for and received comments from a large number of interested parties, including SPACE, the National League of Cities and the American Planning Association, and has had the matter under study since May.

A favorable ruling by the Commission, coupled with a growing body of court decisions such as the one obtained in Canton Township, could accomplish much in helping to alleviate a problem that has prevented millions of American consumers from enjoying the full benefits of satellite technology.



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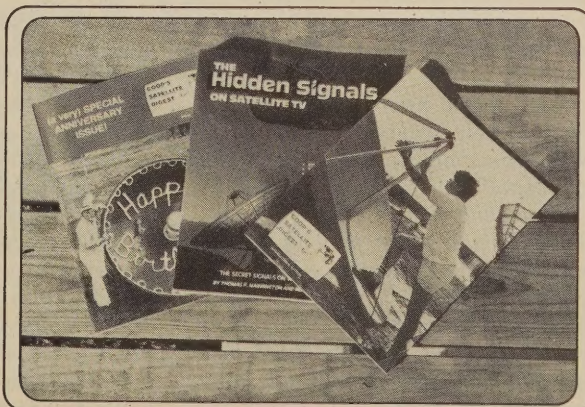
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Continued from page 10

The first home satellite dishes were solid metal in design; metal panels fitted to metal hubs and were held in place with metal support trusses. Later satellite antennas would be fiberglass in composition, with metal mounts or support structures. Still later models would substitute a screen metal "mesh" for the surface, but retain metal supports. We had all three varieties plus some new "light weight composition" fiberglass dishes on the farm when Kate hit.

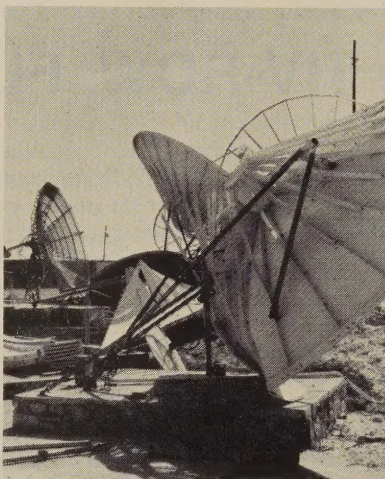
A couple of years back, to counteract "stories" that mesh antennas were not as structurally sound as metal or fiberglass antennas, a leading manufacturer of mesh antennas (Paradigm Manufacturing Co., or *Paraclipse* antennas) arranged for a series of "wind machine tests" for their dishes. Using huge machines capable of creating sustained winds of up to 100 miles per hour, the tests involved pouring thousands of gallons of water into the wind machines and then forcing the wind driven "rain" into the dish antennas. *Paraclipse* created a memorable series of trade ads using highly graphic photographs of the wind machines pounding the mesh antennas, and their synopsis was that (their) mesh antennas withstood hurricane force winds better than solid antennas. On the "surface", the statement that a mesh dish "will have a smaller wind resistance than a solid dish" seems very plausible. A person can see the holes in a mesh dish and logic should tell you that the holes in the mesh will allow the wind to blow through the surface.

However, there is more to the logic than the holes. The tiny strands of wire do have a measurable surface area, and they will therefore "catch" and resist the passage of air (wind). So on second inspection, we come to the conclusion that a mesh antenna should have a lower surface resistance to the wind than a solid antenna, but not "no resistance".

A satellite dish antenna is a "sail". Think of it this way; pretend in your mind you are carrying a 4 by 8 foot piece of plywood across your yard. The wind is blowing and that piece of plywood is a 32 square foot "sail". Yes, it is difficult to walk, hold the plywood upright, and not fall down with the wind blowing. An eight-foot satellite

dish has almost the same wind resistance as our piece of plywood. If you drilled uniform holes in the plywood, some of the wind would pass through and your "load" would be reduced. A mesh antenna is akin to a piece of plywood with holes drilled throughout the surface.

Some experts, however, point out that when the wind strikes the tiny metal strands on the mesh surface, much of the wind bounces off the mesh and creates something called "secondary eddy currents". That means the wind is redirected by the wire strands and these people claim that as the wind speed increases the eddy currents create a new "blanket of air" which attempts to "fill



**Dish Disaster** - Hurricane force winds turn Coop's dish farm into crumpled metal. A *Paraclipse* antenna equipped with a horizon to horizon mount fared best. Pipe mounts turned out to be the weakest link. Every 3-1/2 inch pipe mount was bent over or broken.

in" the mesh holes. They say it this way:

*"At some speed, the porous surface of the mesh 'fills in' and becomes a solid; at that point the mesh antenna ceases to act as a holed surface and it begins to act as a solid surface."*

In other words, say these people, as the wind speed increases, there will come a point where the relatively lightweight mesh dish suddenly is carrying the wind load of a solid dish. One would expect the lightweight mesh dish to collapse under such a strain. *But at what wind speed might such a disaster occur??*

We didn't plan to have Hurricane Kate cross over Provo. We did not

plan our 22 dishes at the West Indies Video test site for the likelihood that a devastating hurricane would cross directly over the site. We are not pleased with the aftermath but surely we can learn from what transpired.

In addition to our own 22 antennas operating before Kate hit, we also were responsible for another 15 antennas located throughout the islands. Immediately after the storm passed, we inspected the locations for all 37 antennas. Here is what we found.

- 1) Only two antennas survived 4.5 hours of 100-mile plus winds with no damage at all (i.e., when the storm had passed, the antennas were working just as before the storm. They were both antennas made by *Paraclipse*; a 16-foot horizon to horizon dish and a nine-foot horizon to horizon dish.
- 2) Only one antenna suffered no direct damage although an unrelated (by product brand) motor drive did suffer damage. When the motor drive was replaced, the antenna was found to be in perfect (before-Kate) working order. That was a 12-foot *Paraclipse* dish.
- 3) Six antennas suffered panel damage. They required replacement panels (i.e. one or more new screen mesh pieces). Three of these were *Paraclipse*, two were *Conifer* and one was *Aristocom*.

This note. We are now at 9 of 37 antennas and *all nine* here are mesh type construction.

- 4) Eight antennas suffered mount or support pipe damage. This meant the steel mounts which hold the antennas in place "gave away" because they could not handle the 100-mile plus winds. When the mounts gave away, the antennas either fell over, flew off the mounts or simply stayed in place at a "raskish" (non-working) angle. Three of these antennas were mesh, three were fiberglass and two were metal.
- 5) The balance of the antennas "did not make it". *They were totally destroyed.* Four of those "not making it" were large 20-foot all-metal dishes which to the casual inspection were built like the proverbial battleship.

Continued on page 80



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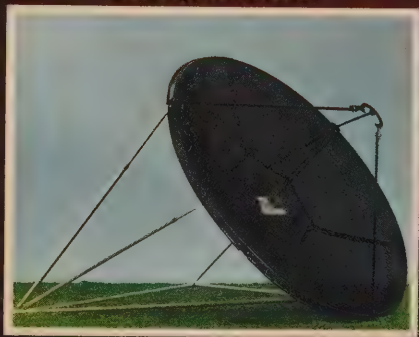
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DISCO DISTRIBUTING CO.  
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##### New Jersey

CABLE TV SUPPLY COMPANY  
Cinnaminson, (609) 829-0100

##### New York

NATIONAL SATELLITE  
COMMUNICATIONS

Clifton Park, (518) 383-2211

##### North Carolina

STAR PATH SYSTEMS  
Hillsborough, (919) 732-9367

##### Ohio

AMATURE ELECTRONIC SUPPLY  
Wickliffe, (216) 585-7388

CABLE TV SUPPLY COMPANY  
Brecksville, (216) 526-0919

SATCO USA  
New Philadelphia, (216) 339-7779

##### Oregon

SRC INDUSTRIES  
Ontario, (503) 889-7261

SRC INDUSTRIES  
Wilsonville, (503) 682-2467

##### Pennsylvania

SATCO USA  
Harrisburg, (717) 652-4851

##### Tennessee

ECHOSPHERE  
Knoxville, (615) 966-4114

##### Texas

ECHOSPHERE  
Dallas, (214) 630-8625

SATELLITE DEALER SUPPLY  
Beaumont, (409) 842-0954

SATELLITE DEALER SUPPLY  
Spring, (713) 288-9104

SRC INDUSTRIES  
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B & J ENTERPRISES  
Keyser, (304) 788-0060

BLUEFIELD DISTRIBUTING  
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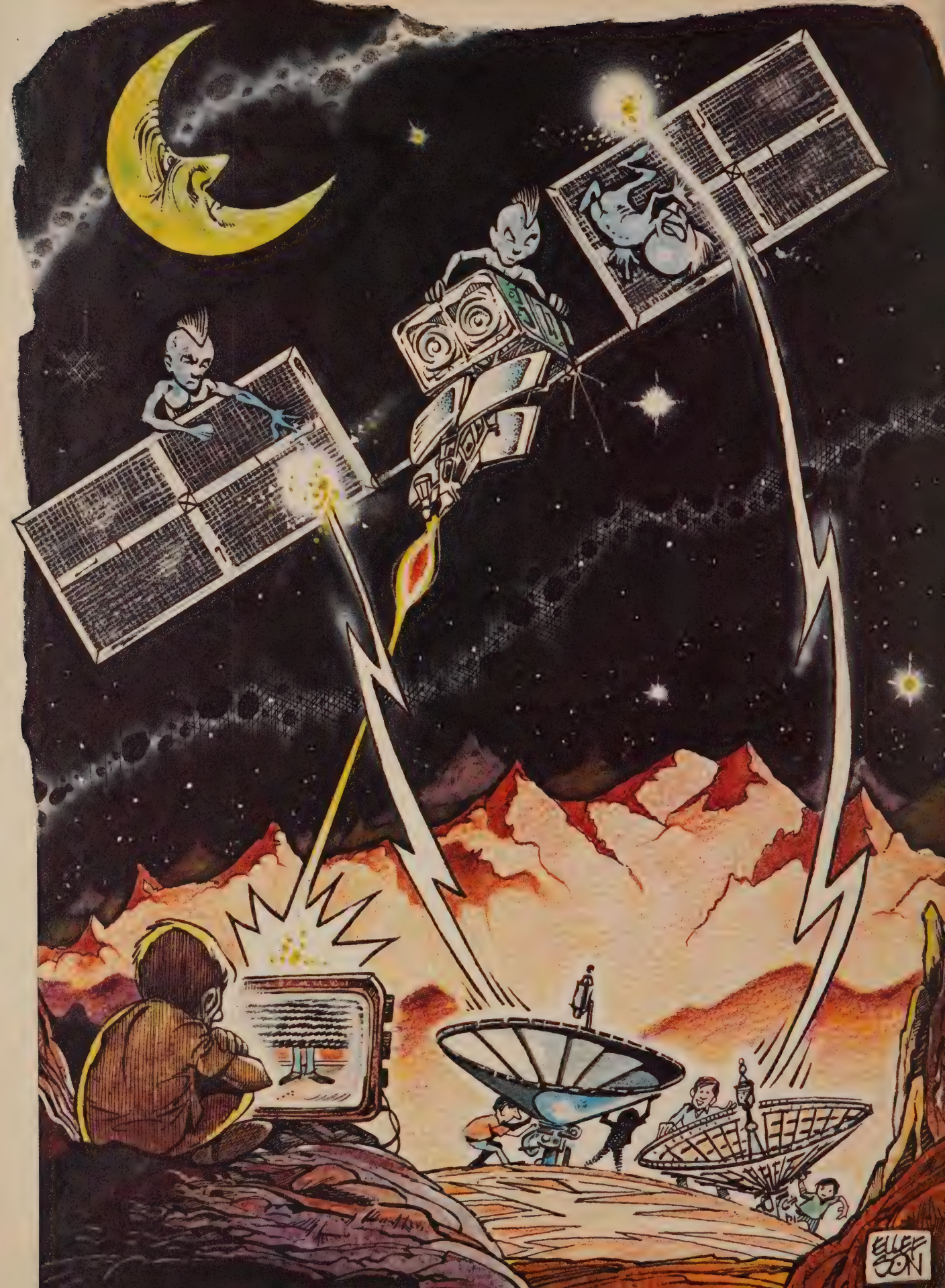
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AMATURE ELECTRONIC SUPPLY  
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(Feedhorn not included.)





ELLEN  
SON



# The Threat Of SCRAMBLING

## *It's A Star Wars Battle In The Skies And In Government For Your Viewing Freedom*

BY BOB COOPER, JR.

**T**he history of scrambled television service pre-dates the current rhubarb in the (home) satellite field by more than three decades. Early tests with scrambled broadcast and cable transmissions were conducted in the 50s and just about every significant electronic firm in North America has introduced a scrambling system at one time or another. Zenith was one of the first and their "Phonovision" system used your telephone wires as a control circuit. Zenith, it is rumored, may have spent more than \$100,000,000 on their system over 20 years or more. Since many of those dollars were at pre-inflation dollar levels, you can see that there has been a ton of money tossed at the concept of scrambling through the years.

Scrambling on the surface seems "unAmerican"; possibly a plot of a leftist nation bent on destroying our economic system! We have grown up accustomed to the concept (as Senator Barry Goldwater puts it) "Anything that falls in my yard is mine; if they don't want me to have it, they should keep it out of my property!" The Arizona Senator gets rave reviews in TVRO trade press for his outspoken statements. He also gets to speak at satellite trade show conventions and is often featured in industry trade publications. Goldwater is something of a hero to the TVRO crowd.

The reason many view scrambling as unAmerican is because the airwaves are "free". They belong to the public and we expect anything "in the air" to be available for our use. The very fabric of the rules and regulations of the regulatory agency charged with policing the airways, the FCC, clearly states their commitment to make "maximum number of broadcast services available to the maximum number of people". It also says "at the lowest possible cost". What could be more maximum coverage at lower cost than satellite TV? If there is an answer to that rhetorical question, it hasn't been invented yet.

There are several key underpinnings in the law, however, which reveal that contrary to our intuition and best wishes, scrambling is neither illegal, nor unAmerican. We'll skip fattening and immoral for now.

Here's "Key-One". Broadcasting.

Television and radio as you knew it "BS" (before satellite) has fit the general system whereby one person or company provides the programming while the other group gets to tune-in those broadcasts merely by purchasing the appropriate receiver. *Broadcasting* has been a one-way system; signals "radiate" outward from a central broadcasting tower to reach anyone who has possession of a receiver. The system pays its own costs because users either fund it directly (i.e. PBS) or indirectly (i.e. advertising). In most countries of the world, the government operates the central

broadcasting system (station) and the system is paid for directly (taxation) or indirectly (subsidy) by the government. As you might suspect, when the broadcasting system is operated by the government, there are special rules for program censorship imposed by the government.

Early radio broadcasts in the USA were put on the air for a combination of reasons: *commercial sponsorship* was not one of these reasons. Most early transmitters were operated either for the "ego" of the operators or to sell receivers. Advertising support started quite by accident and at the time it was unprecedented in the world. In many portions of the world, it is still unprecedented. The first federal "radio rules" did not address commercial sponsorship of radio programming (1912 and as amended in 1927). It was not until 1934 that a revised "communications law" recognized the concept of commercial sponsorship of programming. It was not until the 1950s that the present broadcast system really had a strong foundation in law. So all of this is really very new and for the most part it has been an evolutionary kind of business system feeling its way along as it has developed.

Not all radio (and television) transmissions are "broadcasting". An example:

"To all cars; we have a person located at the bus depot who is causing a disturbance. *All cars available* please report to the bus station."

This (police) transmission was a "broadcast" because no specific recipient was "addressed". It went out to "all cars".

"Car 54, we have a person at the bus station who is creating a disturbance; please respond."

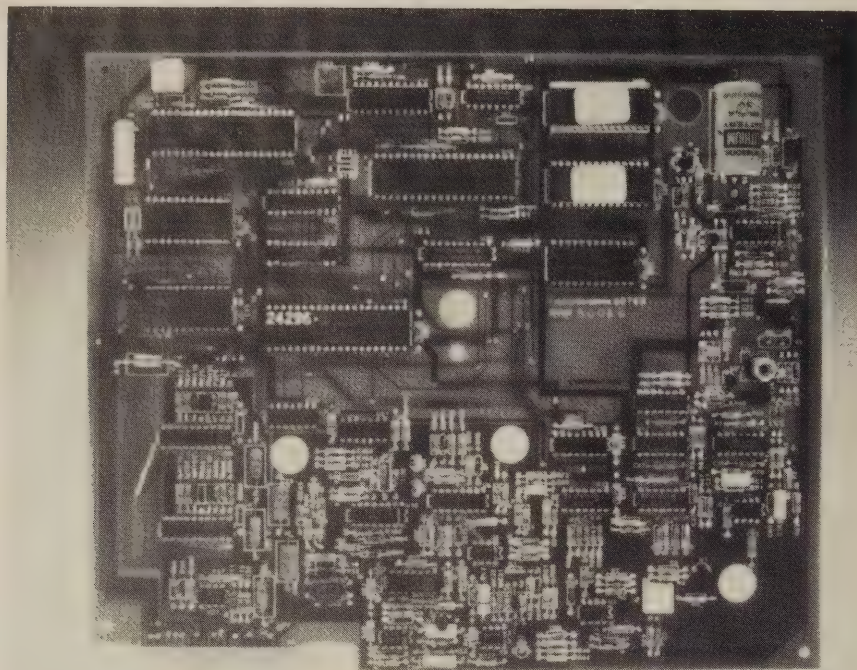
This transmission is not a "broadcast" because it was directed specifically to car 54. If not a "broadcast", then what? The answer is "private communication".

FCC rules established first in 1934 address the differences between "broadcast" and "private communications". Some transmissions (i.e. radiotelephone) are catalogued as "private" by classification. **All radiotelephone calls are private.** Other such classifying is done by "frequency"; i.e. all transmissions operating in the 3,700 to 4,200 megahertz "band" are private while all transmissions in the 540 to 1,600 kilohertz band are "broadcast". Satellite transmissions are catalogued by frequency, and by service, *as private*.

But the FCC, back in October of 1979, sought to clarify this satellite problem and in so doing established a legal precedent for public use of private transmissions. It said, in effect, that satellite transmissions privately owned could be used by the public as if they were "broadcasting services" and if those satellite "broadcasters" did not wish their trans-

*Continued on page 19*





**Inside The Descrambler** - High tech electronics that clear the TV picture.

## What About The “SCRAMBLER HANDLER?”

It's dubbed the “scrambler handler” and it has been given the job of descrambling HBO and other programming. A wonder of high-technology, nearly everyone is trying to guess whether or not it will become a standard in every home satellite system.

VideoCipher II made by M/A-COM uses the Data Encryption Standard (DES) algorithm of the National Bureau of Standards and it is dubbed the “ultimate in security.” Of course, with stores of hackers “breaking” security systems prominently featured in the media, one can't help but wonder how long it will be before this system, too, has been “black boxed.” (Editor's note: apparently this has already happened in terms of the video; the audio, however, appears to use a far more sophisticated scrambling system - see accompanying article by Bob Cooper.)

The unit costs \$395 and is available from M/A-COM distributors and from TVRO dealers. One box can be used to descramble not only HBO, but any other programming using the VideoCipher scrambling system. (Currently that means Cinnemax, but M/A-COM indicates that it will include Showtime and perhaps other channels in the future.)

Of course, that doesn't mean that you simply buy the box and are tuned in. Pro-

grammers are currently jockeying to determine how much of a fee they will charge for those who receive their programming.

You see, the devil in this little box is that each one is individually addressable. If you don't pay your bill, your very box can be turned off (it won't descramble) by the removal of a carrier code on the programming.

This is super high-tech. It also means that to use this box you need a receiver that can discriminate that one signal burst that addresses your descrambler. It may well be that on this ability (or inability) to work with existing receivers will hinge the ultimate success or failure of this unit.

M/A-COM indicates that the first units available (January, 1986) will be the Model 2000E/B which must interface with a receiver to use baseband video. 10,000 of these units will be produced. The next model will be the 2000E, which will interface with both baseband and 70 MHz receivers. They expect to produce 200,000 of these units in 1986.

M/A-COM has released a list of receivers that are compatible—it urges dealers, “...do not let consumers test VIDEOCIPHER II compatibility with receivers not on this list. We do not want product returned due to non-compatibility.”

### Receivers Successfully Tested With The VideoCipher® II Consumer Descrambler

#### MODEL 2000E BASEBAND and 70 MHz INTERFACE

##### Baseband

Luxor Mach 2 9570  
M/A-COM H-1  
M/A-COM T-1  
M/A-COM T-2  
M/A-COM T-6  
Panasonic C-2000  
Viewstar 1450  
DX Communications  
DSB-600  
DSB-700

##### 70MHz

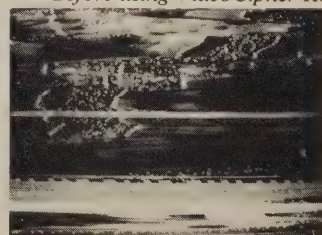
Amplica CSR 100  
Amplica CSR 200  
Amplica CSR 300  
Intersat Baby Q  
Channel Master 6129  
Channel Master 6130  
Channel Master 6133  
Channel Master 6134  
Channel Master 6138  
Drake 240A  
Drake 324  
Luxor 9550  
Uniden 1000  
Uniden 3000  
STS MBS-SR  
KLM Skyeeye X  
Toki 220  
Sat Tech R-5000  
Lowrance System 70  
McCullough USA-1  
GCI 8300  
Bowman SR-1500  
Bowman SR-2500  
Winegard RF-1000  
Wilson YM400  
Wilson YM1000

#### MODEL 2000 E/B BASEBAND INTERFACE (only)

Luxor Mach 2 9570  
M/A-COM H-1  
M/A-COM T-1  
M/A-COM T-2  
M/A-COM T-6  
Panasonic C-2000  
Viewstar 1450  
DX Communications  
DSB-600  
DSB-700

##### Scrambled -

*Before using VideoCipher II.*





missions to be seen and used by the public at large, "then they can scramble those transmissions".

In the 1979 decision, the FCC opted for new technology, agreeing that while satellite transmissions had always been private there were those using this new technology (i.e. PTL, CBN, others) who desired reaching *any and all viewers*. To satisfy these satellite broadcasters, the FCC decided to insist that the burden of keeping non-public transmissions private should fall on those satellite broadcasters who wished to be private. Thus the technology, the burden and the cost of scrambling, became a burden for the transmitting company to bear.

The foundation in law for scrambling of private transmissions is very clear. Even stations licensed primarily as broadcast (unscrambled) systems are free to adopt scrambling delivery techniques with regular (UHF) TV transmission systems (approximately 50 UHF TV stations have at one time or another experimented with scrambled program delivery; most have failed in the marketplace). Courts have reviewed the FCC decisions authorizing such scrambled transmissions and have generally supported the FCC decision to allow such scrambling.

*So is scrambling legal?* The answer is yes. Is scrambling American? It may be even more American than standard (commercial supported) broadcasting when you realize that commercial supported television places an advertising tax "burden" on every purchaser of a product, including those who did not avail themselves of the information or entertainment value of the programs sponsored by the product supplier.

Scrambling is the only practical technique when you are mixing advertiser supported program transmission with viewer supported programming. A cable that delivered *only* advertiser supported programming would also have no need for scrambling. You scramble when you wish to establish "classes of viewers"; when you wish to separate those who are willing to pay (something) extra for specialized programming from those who have no such desire. The principal of scrambling applies to over the air broadcasts, cable delivery and satellite delivery. It is not unique to any single delivery technique.

The satellite scrambler faces a number of unique challenges which terrestrial broadcast scramblers have not faced. Included are:

- 1) Universal reach to all of a continent, compounding the size of the scrambling "universe" and making individual (customer by customer) "addressing" more complex;
- 2) Black-out regions, especially in sporting events, where certain areas of the country are prohibited by contractual terms from accessing certain events (ESPN has this problem);
- 3) Distribution largely centered in rural regions, away from established sales and service facilities;
- 4) Interfacing limitations with dozens of differing receiver designs, many of which are not directly compatible with the scrambling/descrambling equipment;
- 5) A "hostile" customer base, not ready nor willing to accept the reality of scrambling nor the pricing and distribution scheme proposed;
- 6) An uncertain technical performance record for the scrambling/descrambling equipment including the

probability that there will be massive failures associated with the system, adding to customer apprehension and sales resistance;

- 7) A non-supportive "trade press", largely reflecting the fears of the TVRO trade itself that the system is inadequate or unacceptable;
- 8) A combative TVRO trade association, ready to pull the trigger on both legislation and federal court suits to tie up the implementation of scrambling;
- 9) A disorganized (cable TV/CATV) programmer base, unwilling to agree on either the type of scrambling format to be used or the time table for implementation of scrambling.

## THE Equipment

Several firms introduced scrambling systems to the marketplace. Only one seems to have the attention of the *cable* programmers at this point; the LinkAbit system from M/A-Com. LinkAbit is a moderate grade scrambling system with semi-secure video scrambling and hard-security audio scrambling. The system is based on scrambling techniques developed for the US military and its level of technical sophistication is considerable. The LinkAbit system accepts that a television program you *cannot hear* is virtually worthless to the casual viewer. It therefore concentrates on hard (or difficult) scrambling of the sound (audio), doing only moderate scrambling to the video. Reasonably competent electronic enthusiasts will "break" the video codes quite rapidly. The audio may never be broken, in spite of grandiose claims to the contrary appearing routinely now in TVRO trade press.

## INTERFACING The Equipment

Ideally, the Videocipher descrambler would connect into any standard TVRO receiver through a commonly available "patch cable". Unfortunately, M/A-Com totally botched the interfacing requirement announcement late in 1983 and the marketplace has still not fully figured out how to make existing receiver designs attach to the new descrambler. Some suggest that M/A-Com created this confusion on purpose since a confused market is more apt to opt to use M/A-Com receivers where the interfacing to the Videocipher is assured. M/A-Com denies any deliberate confusion here but the marketplace appears unconvinced of M/A-Com integrity.

There are hundreds of thousands of receivers now in consumer hands which will require technical surgery if a descrambler is to be connected to them and work. M/A-Com has not released any hard data which will assist the field technician to make these modifications to the receivers, again leading to the assumption that M/A-Com is being "difficult on purpose". M/A-Com says it is the responsibility of the original receiver manufacturer to provide that data, but then it also fails to provide the original receiver supplier with the help needed to make this happen. To date, M/A-Com has kept virtually all of the important (critical) information to itself leaving the marketplace to flounder on its own. At best, if M/A-Com has not been deliberate with creating this confusion, they have been exceedingly sloppy and hardly without guilt.

Those who already own a TVRO receiver and who might wish to subscribe to scrambled programming will probably end up buying not only a \$395 Videocipher but also a brand new (scrambling compatible) receiver. M/A-Com has repeatedly urged dealers "not to fix or modify existing receivers, but rather grasp scrambling as an opportunity to



# Scrambling from page 19

sell the consumer a new receiver . . .". The consumers, rightfully, can be expected to object to this approach.

## THE Programmers

The cable programmers and their affiliated firms, the program distributors, are an interesting group. On the surface, they appear to be all show-biz, Hollywood and The Big Apple. Beneath this neon and glitter, they are jail keepers. There is terrible incest within the cable programming and distribution ranks; major cable programmers (HBO) are owned by firms that own major cable systems (ATC), and then jointly they own or control minor league programming players (USA NET)

Not one of the present cable programmers looks upon TVRO customers fondly. They owe their cash flow and therefore their allegiance to cable subscribers; who are themselves an often mis-used substrata of Americana. Cable system owners fear the unrestricted growth of TVRO because people seldom have a TVRO and continue their cable subscriptions. *A cable subscriber has a very real "value" to the cable system operator; \$1,000 per cable home.* Thus a cable system really dislikes losing a cable subscriber (present or future) to private TVRO ownership because each such loss is a reduction in the cable operator's net worth by \$1,000.

*Cable system operators therefore oppose TVRO.* Their trade associations oppose TVRO. Their bankers and accountants oppose TVRO. Not surprisingly, the cable system operators have also been quite successful in arguing before their city councils that TVROs should be banned from many cities.

Cable system operators wield great economic pressure on the cable programmers. When the cable systems are owned by the same firms that also own the programmers too, there is an incestual relationship and perhaps multiple conspiracies to keep TVRO growth retarded.

Cable programmers to date have shown no interest in pricing their products fairly to TVRO. A \$25 charge for CNN plus CNN-2 *per year* is not a fair price. A charge of \$12.95 *per month* for HBO is not a fair charge. A charge of \$19.95 *per year* for ESPN is also not a fair charge. In fact, the "direct sell" charges to date sound so high as to strongly suggest that the programmers are selecting fee schedules *designed on purpose* to discourage TVRO viewing.

Why?

A significant part of TVRO's lure until now has been the 100 plus *FREE* channels of television found with a TVRO. By scrambling, and charging high fees, the lure is lost. If cable would really prefer to see TVRO simply slow down and "go away", scrambling the services *and then* pricing the services beyond "reach" of most viewers would accomplish their goal.

It is very important to keep in clear focus the following:

*"Cable TV makes money by charging monthly fees.*

Cable TV makes far more money however by selling subscribers to new owners for \$1,000 each. Cable does not like losing that \$1,000 payoff when cable subscribers drop cable in favor of TVRO. Cable operators will never, willingly, settle for any TVRO plan which encourages people to drop cable in favor of TVRO . . .".

## CABLE'S PLAN To Get Its \$1,000 Back

At least one major cable system operator realizes that, long term, cable cannot stem the tide of TVRO growth. So

they have been looking for a way to "co-opt" TVRO; to in effect, *take over TVRO* so it is their industry. Their plan may well work.

TVRO objects to two parts of scrambling:

- 1) The cost of the hardware, and,
- 2) The cost of the software.

TVRO has also objected to the terribly one-sided terms put down by M/A-Com and the single source for the descramblers (only M/A-Com builds them and to date no other firm has been authorized to do this important function).

A major cable operator sees an opportunity here; lower the cost of the descrambler and the cost of the software. They can afford to do this.

- 1) Rather than charging \$12.95 per month for HBO alone, this firm proposes to charge \$8 per month. They have also suggested that they might "package" HBO and Showtime together for around \$13 per month. Other services would be priced far lower.
- 2) Rather than insisting that the TVRO viewer put down \$395 all at one time for a descrambler, this firm suggests they will lease you the descrambler for another \$8 per month.

Their concept is that by using their "wholesale buying power" for both the hardware and the software, they will be able to reduce the cost of watching scrambled programming significantly. They envision a monthly charge of between \$25 and \$30 for a home which "takes everything" or most everything which is available via scrambled transmission. If this plan works, it will actually be slightly less expensive to "subscribe" to satellite delivered programming services than it will be to receive the same programming through a local cable company. There is a hitch, however. There is likely to be a pricing differential that will apply to all TVRO users who live in an area where cable TV is available. That extra fee is likely to be around \$6 per home per month; a sort of "penalty fee" charged only to homes where cable is available.

*We'll see.*

In the interim, it does provide us with the first concrete sign that the cable camp is not totally inflexible on this important issue. What remains unproven however is whether this one (major) cable firm lead in this area will be accepted or emulated by the hundreds of other cable firms out there.

## LEGISLATION As A "Tool"

There are great social and business conflicts in all of this. And whenever two sides get this far apart in America, sooner or later somebody proposes a legislative solution.

Actually, the history of TVRO includes legislation from the very start of our technology. Prior to October 18, 1979 it was not legal to own a TVRO unless the dish had been licensed by the Federal Communications Commission. And this was no easy license to obtain. Tremendous bureaucratic paperwork was required with each application including detailed engineering and financial studies typically costing the applicant more than \$1,000 each. In addition to the expense involved in licensing a TVRO, the FCC also required license applicants to install antennas *at least 15 feet in size* to obtain a license. In other words, you *had* to have a license and to get a license, you *had* to use a dish larger than 15 feet. If that "regulation" was still on the books today, there would be no significant home TVRO industry today. *That all ended on October 18, 1979.*

*Continued on page 22*



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Cable operators favored elimination of that regulation because this allowed cable (and others) to use smaller, less expensive dishes. But within a year, cable was wishing they had not been in favor of such a change. Starting in 1980, Home Box Office (HBO) began an effort to get the US Congress to pass new legislation designed to stop TVRO growth. At the same time HBO was trying to shut down TVRO with new legislation, they were also very active contacting every owner of a TVRO they could identify to advise the TVRO owner that owning a TVRO and watching HBO (et al) was illegal. Of course it was not illegal, but that hardly stopped the letters from flowing out of HBO offices in the thousands. Those letters are directly responsible for the formation of a TVRO "trade association"; SPACE. When manufacturers and dealers in TVRO equipment began receiving these missives, they collectively agreed to "fight HBO". Looking back, HBO erred with their anti-TVRO letters because those letters became a rallying point for the young industry.

One piece of HBO legislation sponsored in 1980 would have made even ownership of a TVRO illegal. SPACE, barely months ago, succeeded in keeping that legislation from being adopted by simply out-lobbying the HBO people. At that time, HBO was all alone in the anti-TVRO right as the remainder of the cable industry had not yet awakened to the "threat" of TVRO. And in fact, it would be 1985 before the rest of the cable industry really focused on the growth (and economic threat) of TVRO. Those would be very important growth years for TVRO.

SPACE's legal maneuvering was innovative from the very beginning. Short of funds and manpower, SPACE has been tremendously effective because of the direction provided by one *Richard L. Brown*, their attorney. Brown has "saved" TVRO from crib-death on numerous occasions while under his direction the TVRO industry has been building a "war chest" of loyal, supportive legislators who have championed the TVRO cause. *Congressman Charlie Rose* (D-NC) was the first legislator to support TVRO interests but the SPACE "stable" of supporters has grown steadily since that first 1980 battle. With Senators *Goldwater*, *Gore*, and others carrying the flag for TVRO, the influence of SPACE in Washington has become a significant factor as we enter 1986.

At this point in time, SPACE is requesting two types of legislation from Congress:

- 1) First, SPACE wants a *moratorium* on scrambling; an end to any further scrambling until the technology and marketing of scrambling is sorted out.
- 2) Second, SPACE wants the FCC (or some other federal agency) to be "in place" to adjudicate squabbles concerning "rates" and "access" to scrambled programming.

Cable interests wish neither of the above. A delay in scrambling (i.e. the moratorium) would allow TVRO to grow and become stronger *without scrambling*. Cable has already seen what 1.5 million homes equipped with TVRO can do in Congress; two more years of TVRO growth, sans scrambling, can only result in greater lobbying strength for TVRO and diminished cable strength. And federally regulated rates would leave cable programmers in the uncomfortable position of having somebody else set their rates for them.

Congressional leaders, such as *Tim Wirth* (D-Co) who are in a position to control legislation have now agreed to "hold hearings" relating to TVRO. Wirth oversees legislation dealing with communication matters in the House and he has been romanced by cable interests for almost as long as he has been in the House. Cable was not pleased when Wirth agreed to hold TVRO hearings and those hearings (scheduled for about the time you read this) are sure to be exceptionally controversial.

Cable interests, in particular HBO and M/A-Com, have argued that no legislation is necessary; that descrambler availability and pricing will sort itself out in the marketplace. Without federal help.

TVRO interests point to the \$395 cost for descramblers, and the HBO announced \$12.95 per month charge for HBO service as evidence that cable is trying to kill TVRO in the marketplace. Cable hopes that if it can begin the process of scrambling fulltime (HBO was so scheduled for January 15th) and the process of distributing descramblers, their "momentum" will carry them through. TVRO had originally hoped to stop the scrambling-express *before* it got started. It now appears that TVRO will have to deal with an operating (rather than threatened) scrambling system.

## NO Winners?

To date, HBO and M/A-Com claim they have invested more than \$50,000,000 in creating a working scrambling system. That system seems totally secure against *casual* interlopers. It is probably a system which will serve their needs for a number of years to come even if it turns out to have minor operational flaws and it also turns out to be a quite expensive system to operate and manage.

The real problems with the system are not the system itself but rather with the users of the system. Cable TV wants the signals scrambled *for the wrong* "social" reasons; they want to stop TVRO growth with scrambling, rather than using the scrambling system to simply derive additional income. And that is the crux of the battle between TVRO and cable. One side, cable, is not playing according to the accepted rules of American commerce.

Hearings before Congress are likely to concentrate on non-issues and if cable has its way, the hearings will *never dig deeply* into the motivations of cable in this battle. SPACE recognizes this fact and has been attempting to interest the Department of Justice in the cable/TVRO fight. SPACE feels that DOJ may be more able to correct this problem than Congress. Phrases such as "Restraint of Trade" and "Anti-Trust" permeate any serious discussion of SPACE/TVRO problems.

TVRO growth began to stunt late in 1985 as the normal growth patterns slowed down in the marketplace. Clearly, *scrambling has already taken a toll* and clearly the cable "PR" effort to "educate" the public and to keep the public from buying TVRO has been quite effective.

*This is an issue that begs resolution.* An instrument of technology, the TVRO has become an instrument of social and business change. And like any such instrument in the past, it has attracted its detractors. TVRO will find its place in the sun here, but not without several more years of turmoil and battling. TVRO appears to be an "ultimate technology" while cable is best judged as an "interim technology". Total home by home freedom of choice of entertainment and education, via direct satellite service to individual dish antennas, is obviously a far better technology than cable's limited program choices. Cable knows that and it is running scared. ▀



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**BY PROVIDING SELECTION.** Even though Star Com already holds a vast diversified inventory by any distributor's standards, our researchers make it their business to be aware of any new satellite system in the marketplace. It is Star Com's policy that regardless of where a particular product may lie on the price spectrum, quality will never be superseded.

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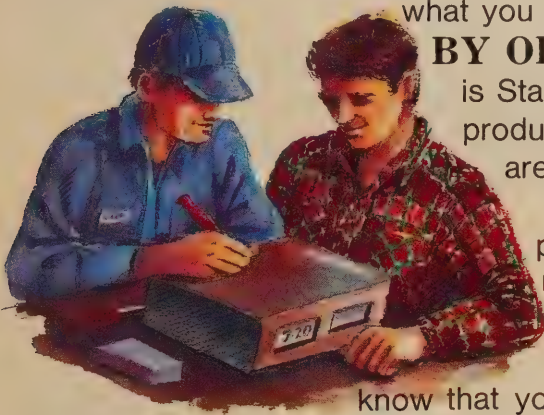
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# STAR COM







# Earth Station Day

## *The Satellite Industry Makes An Impression On Washington, D.C.*

BY BEN HARRY

**W**ashington, D.C.—A curious lunch-hour crowd gathered to watch a man watch television on the Capitol Mall in Washington, D.C. The TV was hooked up to a 10-foot parabolic dish antenna pointed southwest. The man, a satellite television dealer from Tennessee, sensed the audience growing behind him. He picked up an infrared remote control and pointed it toward a box atop the monitor. While changing channels, the dealer cleared his throat as though he owed the people an explanation.

"On this one satellite alone, there are more than 20 different channels," said the dealer in the tone of a well-rehearsed monologue. "You can get 'round the clock movies, news, sports and even weather. If I had a motor to move the dish, I could pick up about a dozen more satellites. It's the ultimate TV delivery system and it's absolutely legal, but we do have a problem," he said as the monitor settled on an encrypted transponder.

"This is a scrambled signal; it happens to be HBO. HBO will let me unscramble this picture if I buy a decoder box for \$395, plus pay a monthly fee of \$12.95. That's unfair because it's about 10 times the amount cable subscribers pay. There are bills in Congress that would guarantee access to scrambled programming at reasonable prices. We're here to tell America what we're about and try to get a fair shake."

There were about 150 such dishes on the Mall that sunny October 29 afternoon, although not all of them were in operation. They were assembled to commemorate Satellite Earth Station Day, a celebration of the first anniversary of the Cable Communications Policy Act of 1984—the law

that affirmed the legality of sales and use of home earth stations.

Although the dish display attracted the attention of rubber-necked motorists and local pedestrians, Satellite Earth Station Day was more than a show-and-tell exhibition. It was an exercise of grassroots lobbying in its most basic sense. Dealers, distributors, manufacturers and publishers in the satellite television business joined forces to promote their industry. It was an opportunity for advocates from at least 46 states to gather en masse in the nation's capital to meet with their senators and congressmen. Even some Canadians attended for moral support. The prime topic of conversation between legislators and their constituents, presumably, was the satellite viewing rights legislation pending in both houses of Congress.

There are three bills currently before Congress that the satellite industry supports. Bills H.R. 1840 and S. 1618 in the House and Senate, respectively, were both introduced to "foster the more widespread availability of satellite television programming." They would ensure home dish owners' rights of access to scrambled satellite cable programming at reasonable rates. The third bill, H.R. 1769, would impose a two-year moratorium on the encryption of satellite cable programming to allow for the development of marketing systems.

The bills were introduced to more clearly define the rights of home dish owners and to counter the potential for unreasonable marketing systems set forth by programmers. In some cases, proposed marketing systems would cost home satellite dish owners as much as 1,000 percent more than most cable subscribers pay for comparable service. It has been speculated that cable television operators, now the primary market for satellite-delivered programming, are pressuring program suppliers to keep the cost to dish owners artificially high. The reason: to protect cable industry investments with a competitive edge. The situation has not only prompted legislators to initiate new laws, it has raised eyebrows at the Justice Department, which is conducting a formal investigation.

Meetings were scheduled with 98 senators (or their aides) and approximately 400 appointments were booked in the House. The meetings, as well as all of the day's events, were coordinated by SPACE, the satellite television industry trade association.

One lawmaker who personally met with his constituents

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**Dishes To Washington** - They came to show support and express concern. Over 150 dishes were arrayed on the Capital Mall in an exercise of grassroots lobbying. Advocates were there from 46 different states and Canada to promote satellite viewing rights legislation pending in Congress.



## Earth Station from page 25

was Senator Steve Symms, R-Idaho. Symms admitted he knew little about satellite television or the viewing rights legislation before the Senate. He patiently listened to statistics of how many jobs and how much money satellite television brought into his state, and he absorbed requests for support of the bills. The senator asked political questions ("At what stage is this legislation?"), personal questions ("Am I a second-class television citizen because I don't have a satellite dish?"), and questions that were a little of both ("Can I get Redskins games even if they're blacked out in the D.C. area?").

Although Symms stopped short of agreeing to support the viewing rights bills, he did promise to study the matters further (a statement reportedly shared by numerous senators and representatives). When the meeting ended, Symms revealed his dream to have a ranch with a view of a river in front, mountains in back, and a satellite dish in the yard. There's no way a letter to the senator would elicit such a positive response.

Meanwhile back on the Mall, a stage was set up for a dealer rally and press conference. Speakers included Congressmen Timothy Wirth, D-Colorado, Billy Tauzin, D-Louisiana, and Tom Tauke, R-Iowa. While Tauzin and Tauke historically have supported home satellite television issues, Wirth has long been sensitive to the needs of the cable industry in his home state. Wirth, who is chairman of the powerful House Subcommittee on Telecommunications, Consumer Affairs and Finance, called for hearings on the scrambling issue to begin in early 1986.

Said Wirth, "If the backyard dish industry is to realize its full potential, dish owners must have access to a wide variety of programming. At the same time, we must recognize that programmers have a legitimate right to protect their property. . . . I know that you are all here today in an effort to see that Congress will take another look at the issues surrounding the scrambling of satellite programming signals. I am sure that you will all be pleased to know that after consultations with Congressmen Tauzin and Tauke, I have decided to hold hearings early next year on the scrambling issue."

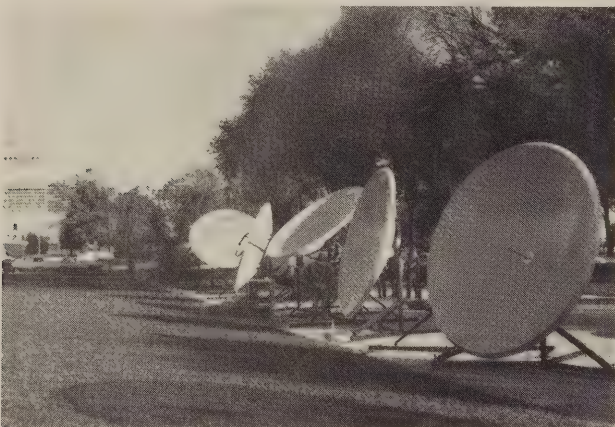
Political demonstrations are certainly nothing new to Washington, D.C., nor are they rare. The satellite television industry, however, utilized an inherent advantage to create an event unique in lobbying history: continuous live television coverage. For 14½ hours on Satellite Earth Day, a video feed was uplinked on Galaxy 3, transponder 5. Satellite dish owners who could not make it to the capital could observe the scene vicariously. Senator Barry Goldwater, R-Arizona, and a number of other influential legislators were interviewed on camera by trade journalists. The production, which will be edited down to a two-hour production available through SPACE, was hosted by Bob Cooper, editor of "Coop's Satellite Digest," and Robyn Nietert of the law firm of Brown & Finn, general counsel to SPACE. Bob Behar, of Hero Communications, produced and directed the show.

As if to confirm the impact of the day, President Reagan sent his welcome and blessings in a three-paragraph note that called satellite television "a reflection of America's ingenuity and know-how." ▲

*Ben Harry is a Sun Valley, Idaho-based free-lance writer who specializes in consumer electronics and high-technology subjects.*



**Setting Up** - They came from all parts of the country and as soon as they arrived, they assembled their dishes to make their point.



**Three bills in Congress** - They would make satellite TV more available and offer "reasonable" alternatives to scrambling.



**Grassroots Lobbying** - Owners, dealers, distributors, and manufacturers in the satellite TV field joined forces.

**Friendly Competition** - Putting aside differences, those in the field worked together to help get Congressional action.





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# The Wave

*Why Everyone Will  
Have Home Satellite TV*





# Of THE FUTURE

BY BOB WOLENIK

**W**hen Alvin Toffler wrote "Future Shock" he anticipated an age when new developments in communication and technology came at us so quickly that we, as human beings, could not adjust to them.

Well, the future is arriving mighty fast. But surprisingly, most of us are instead adjusting quite well. Today, at least in America, there's a TV (usually in color) in every home. When computers were popular, we swarmed to buy them. And now, VCRs have become a household necessity that we readily accept. Instead of being overwhelmed by the rush of the future, most of us have not only accepted it, but welcomed it.

I'm speaking, of course, of consumers—people like you and I who can see both immediate and long term benefits for the new technology. What Mr. Toffler may not have foreseen was that those not accepting the future are mainly those who have economic interests tied to the past.

Consider the case of radiology. Two decades ago radiology was "dirty". Most hospitals invested considerable sums of money in X-ray machines which exposed patients to high doses of radiation and provided relatively poor photographic images.

A decade ago a new kind of X-ray machine, the "CAT-scan" (computerized axial tomography) came into existence. It used relatively less radiation to produce enormously improved images. Yet, many hospitals resisted the new technology, not because it wasn't beneficial, but because they had such a high economic stake in the old machines.

However, patients rightly concerned about the quality of their health care, demanded the new machines and, often reluctantly, the medical establishment followed.

Today, there's yet a new technique for scanning the body, MRI or magnetic resonance imaging. It doesn't use any X-rays at all, but instead uses magnetic fields to produce an image. Apparently there are no side-effects at all to the machine and the images produced may be the best of all.

But once again, hospitals are not racing to the new technology. Having invested often over a million dollars apiece in the of CAT machines, they are not exactly enthusiastic about writing off that expense and spending another million and a half for a new MRI machine.

The story of those with vested economic interests trying to hold back the future is constantly repeated around us. U.S. auto manufacturers for years resisted using new techniques to make smaller and lighter cars because they had invested so much in making bigger, heavier cars. Typewriter manufacturers for years refused to make anything but mechanical machines, until they were blown out of the

water by inexpensive, computerized word processors and printers. Even something as familiar as the morning newspaper was for years laboriously typeset with "hot metal" (creating each word to be printed out of a lead die) when quick and efficient "offset" photo machines were available.

Over and over evidence points suggests that those with vested economic interests in the past are the last to embrace the future. Nowhere is this more evident than in TV technology.

At one time over a decade ago, virtually all television transmission was handled by cable or by microwave ground repeaters. Network broadcasts originating in New York were sent either by Western Union cable lines or by microwave transmission from tower to tower across the U.S. to Los Angeles. Transmissions the other way were handled similarly.

Then came satellite technology. The network could broadcast a signal to a satellite (uplink) and then a station could receive it on the other side of the country (downlink). It was clean, clear and direct. It was an enormous improvement and all the networks (which could see improved transmission and cost savings) rushed to embrace it. Soon virtually ALL distant television programming would go by satellite including every football, baseball and basketball game.

At first those who had a vested interest in the old system, such as Western Union, resisted. But bowing to pressure, even they were soon using birds (satellites) for TV. It remains for many of those who have the greatest vested interest of all, cable TV operators and programmers to resist to the end the new technology.

Cable TV came into its own when the best way of receiving a TV signal was over an electric wire. Today over 35 million homes in this country are connected to TV programming by this electric umbilical cord. Cable lines are the lifeblood of cable TV operators. And not surprisingly many are resisting the development of direct satellite to home television.

(Interestingly, today virtually EVERY cable TV operator receives his programming signals via satellite. Yes, although the cable people may distribute the signal to home via wires, they themselves receive the signal utilizing the latest satellite technology!)

Umbilical wires, however, are yesterday's technology. Today it's possible for EVERY home viewer to receive direct TV broadcasts from satellites using readily available receiver systems. (Inexpensive systems are now down to under \$1,000.) From 16-foot dishes (prevalent just five years ago), the homeowner can today receive a strong TV signal with 6 to 9 foot dishes on C-band and with 3 foot or smaller dishes on Ku-band.

The wave of the future is satellite TV. Engineers at Hughes and elsewhere are currently working on the next generation of more powerful satellites. To be sent up by 1988 or sooner, these birds will broadcast 45 watts or more of power (compared to the current 3 to 7 watts). When they do, almost anyone in the country should be able to receive direct satellite TV broadcasts with a dish no bigger than a hubcap!

*Continued on page 30*

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**A Technology That Can't Be Stopped** - Those with vested interests in the old way of doing things may try, but uplinking and downlinking by satellite is here to stay. Within a decade every car in America may have a satellite receiver that will allow it to "know" its exact location and display a route to any destination. Within 5 years, home satellite antennas will probably be no bigger in size than hubcaps! (NASA Photo)

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## The Wave

*Continued from page 29*

However, understandably, many cable operators don't want you and I to have the new technology. After all, why should we pay to have an electric wire strung to our door when we can get a better, broader signal direct from space. (Remember, the old technology sends the signal from space to the cable operator who then sends it by wires to viewers. The new technology allows the viewers to bypass the cable operator and receive the signal themselves direct from space.)

In addition, some programmers are also resisting the new technology. TV from space is FREE. Programmers can't afford to give away their programs. Hence, companies such as HBO tend to look askance at the new home technology.

The result has been a series of obstacles to home TV viewing. The most significant of these have been attempts to make home TV reception illegal, to scramble the signal and to have unreasonable zoning restrictions against dishes.

The legalization issue was settled last year when a federal law made home viewing perfectly legal. The zoning issue may be largely resolved by the time you read this. (See the accompanying article by Rick Brown on the new FCC de-regulations regarding zoning.) The scrambling issue, however, is still confusing and worth dwelling on for a few moments.

As this is being written, threats of scrambling are being sounded and many are pronouncing it a fact with which we'll have to live. However, it still remains to be seen whether or not it will actually, permanently happen.

I'm reminded of an incident several years ago when many well informed people in the computer field were saying that the CP/M operating system, then so prevalent, was inevitably going to become the standard and dominate the field. Since that time the MS-DOS system, then largely unheard of, has virtually replaced CP/M as the dominant system.

Scrambling may or may not be the way that programmers eventually get paid for their signal. (A licensing system is also a possibility as is paid advertising.) But the point to keep track of is that scrambling is not the real issue. New technology is.

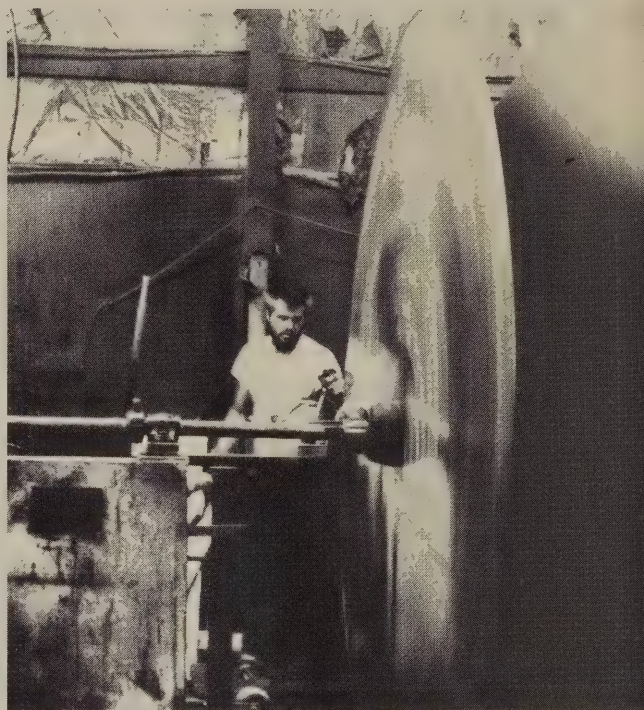
The new technology is direct satellite to home broadcasting. It's here, now. Just this year England abandoned support for a nationwide cable system in preference to a home satellite system. France virtually removed all scrambling so that direct satellite broadcast could reach more viewers.

While those with a vested interest in the status quo may, indeed, temporarily hold back our receiving the benefits of the technology, they cannot succeed indefinitely. When a home viewer can receive a direct signal, why should he pay for an indirect one? It's the same as a patient being refused the benefits of an MRI or earlier CAT machine. It's like General Motors trying to sell big heavy cars in the face of Japanese competition.

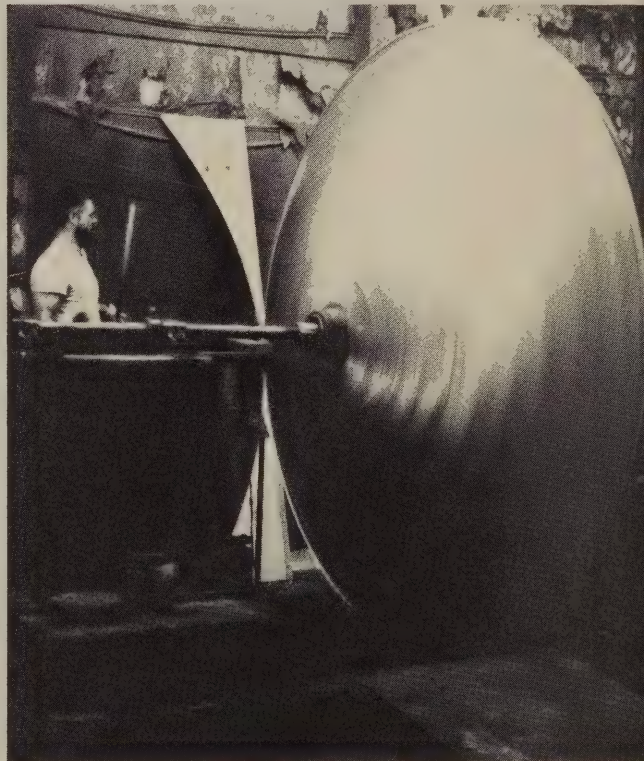
If it's not perfectly evident to everyone now that home satellite TV is the wave of the future, it will be when satellites worldwide become more powerful and every country has direct broadcast.

Home satellite TV is like a wave with a whole ocean behind it. Sand castles can be erected to resist the waves for a short time. But like the ocean, eventually it will become clear that satellite TV direct to homes is irresistible. ▀

# Spinning



**Spin-Formed** - Fabrication of an aluminum satellite dish begins when an aluminum disk is secured to a mold and then spun at 250 rpm. It takes only 3 minutes to form the completed unit.



**Giant Aluminum Dish** - 9-foot antenna comes off forming mold.

Home Satellite TV



# A Dish

## *Solid Metal Antennas Are Formed At 250 RPM*

Ever wondered how they get those solid dishes perfectly round? After all, any indentions or out-of-round spots on the curve would throw the dish off and reduce its signal gathering ability. Yet, some of these dishes are 9 feet across - how to maintain a perfect surface on that enormous area?

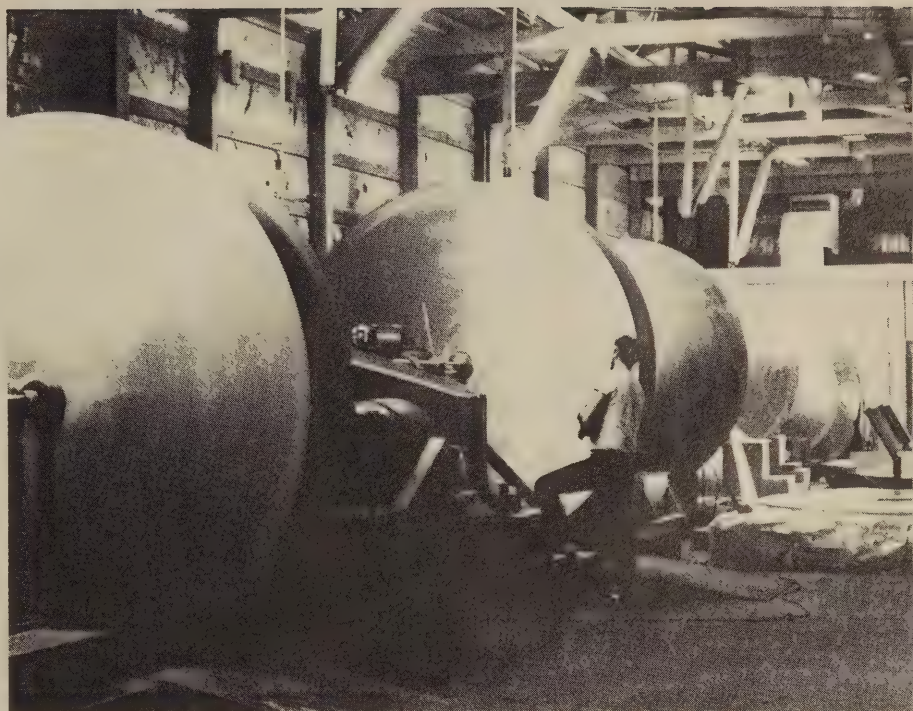
The answer? Spin the dish.

It's done on a giant lathe type device. An aluminum disk of the right size is secured to the end of the turning device. Then, as the disk spins at about 250 rpm, it is forced into a round shape by a mold.

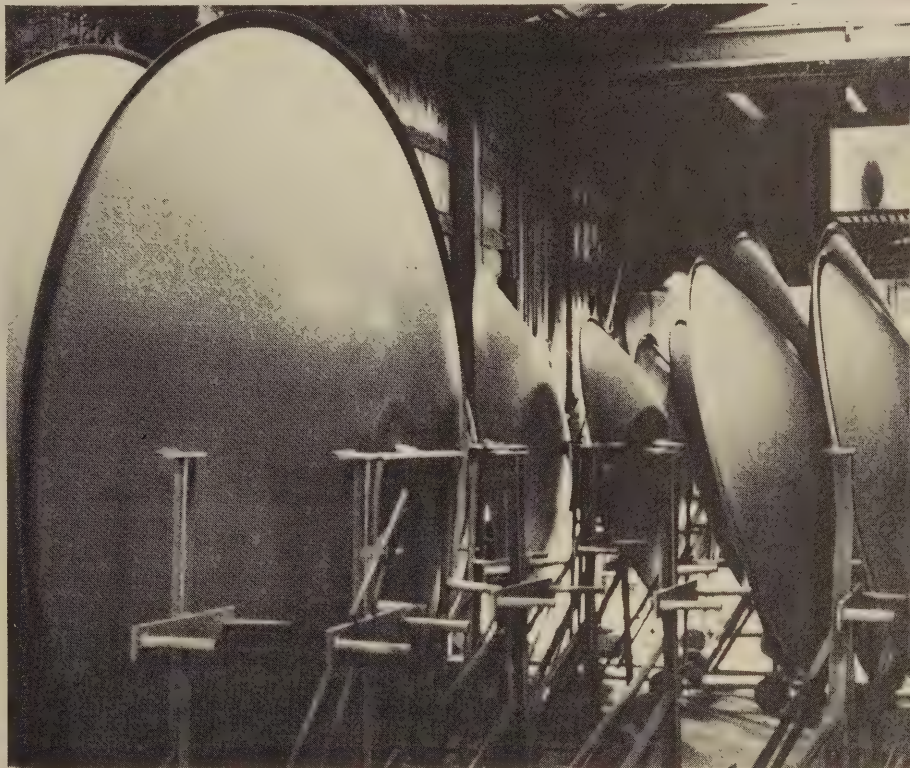
The result is a perfectly formed satellite antenna. It's all done at DH satellite owned by Franklin Weeks. The company has four manufacturing divisions in the U.S. and is opening more in Mexico and Belgium. Weeks notes that currently he is producing over 10,000 dishes a month, mostly exporting to Europe. His most popular product is a spun perforated antenna with the 9- and 6-footers being the best sellers.

Photos courtesy of Reynolds Metal Company. ♣

**Completed Dishes** - Franklin Weeks, President of DH Satellite stands beside an array of his company's aluminum products.

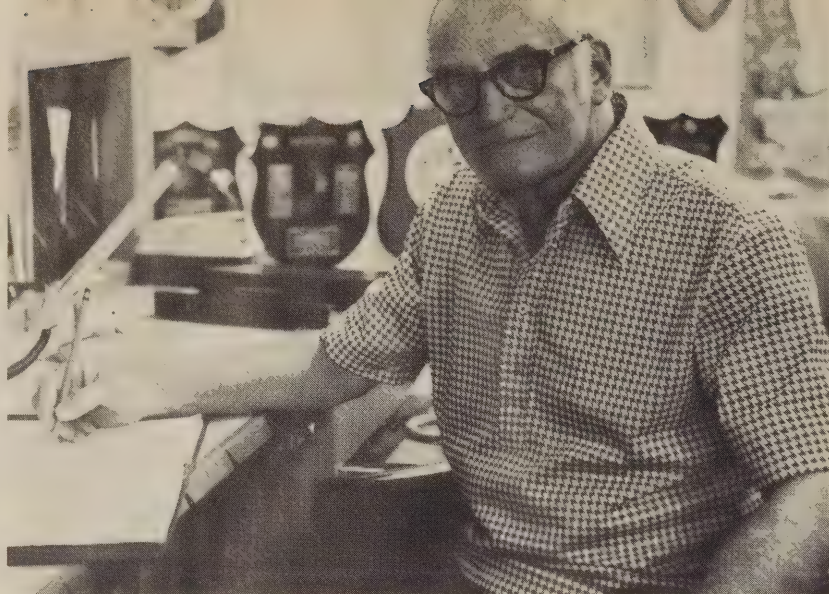


**Inspecting Molds** - Dishes must maintain accurate parabolic curve throughout their structure to properly gather satellite signals.



**Ears To The Universe** - Aluminum dishes awaiting delivery.





# Dish Owner GOLDWATER

*Arizona's Senior Senator Has  
Been A Good Friend To TVRO*

**S**enator Barry Goldwater, Republican of Arizona, has been known as a friend to the home satellite TV field. He or his staff have attended and spoken to TVRO trade shows. The Senator was instrumental in helping to pass legislation which legalized home satellite viewing in 1984. Senator Goldwater has been outspoken with regard to this field.

Because he is viewed as a pivotal leader both within his party as well as from the electorate in general, Home Satellite TV felt it was important to offer Senator Goldwater a platform from which to air his views on the TVRO field. In this exclusive interview, the Senator answers questions which you, the home satellite viewer, may find directly affect you.

*Home SAT TV—*

Senator Goldwater, we've heard that you have a home satellite TV receiver of your own. Do you use it frequently? Do you like it?

Senator Goldwater—

Yes, I use my home satellite receiver almost more than I use cable or straight television. I have the most satisfactory receiver made in Phoenix, Arizona, that I have ever used. It is completely automatic, even down to the automa-

tic fine tuning of each station offered by the satellite. I think home earth stations are a tremendous addition to our way of life.

*Home Sat TV—*

In 1984 you were instrumental in passing the law that helped legitimize home satellite receivers for private use. Can you tell us a little about the background of that bill?

Senator Goldwater—

The satellite viewing rights law was a pleasure to work on. It sailed through in record time, which doesn't often happen in Congress. I think then Congressman Gore and myself introduced the proposal in the House and Senate respectively in late March and the President signed it into law by late October.

By a happy coincidence another bill was finally moving through Congress which I had first introduced three years earlier deregulating cable television, and this allowed the dish bill to ride piggy back through the legislative corridors as an amendment to the related communications measure.

My interest in this subject grows out of my lifelong fascination with what has happened in the field of communications where man's inventiveness has

led to new technologies which contribute to a vastly different and better world.

*Home Sat TV—*

There are other bills affecting home satellite reception currently before congress (mostly on the issue of scrambling). Are you involved in any of these? What can you tell us about them?

Senator Goldwater—

I personally feel any legislation on scrambling is premature at this time. I don't think government should slow down scrambling so long as enough decoders are put on the shelves, fair and reasonable viewing terms are offered, and nobody has a monopoly over programming services. I welcome both the cable and satellite dish industries and want them each to thrive under fair, competitive circumstances.

*Home Sat TV—*

Many of our readers are concerned about reasonable zoning ordinances in their areas regarding dishes. Can you tell us of any legislation which might be coming that would make such ordinances more equitable and reasonable? (Editor's note: See the story by Rick Brown on this subject in this issue.)

Senator Goldwater—

The FCC has already issued a proposed rule to override discriminatory and anti-competitive zoning ordinances, and further action is not needed on the legislation I introduced. Cities have legitimate safety and aesthetic concerns, but they must balance these interests against the statutory and First Amendment right enjoyed by the public to receive signals falling on their homes. Local rules must be adapted to accommodate this personal right. The FCC has just approved an order protecting amateur radio operators from restrictive antenna rules and I hope the commission will make a final ruling for the benefit of dish antenna owners, too, in the near future.

*Home Sat TV—*

What is your personal viewpoint on home satellite TV? Do you think it has a place in the future, or is it a passing fad?

Senator Goldwater—

Home earth stations are here to stay. I not only think they have a place in the future, but they are at the cutting edge of the future. Dish and receiver manufacturers and dealers are poised to satisfy the demand of the public for the various types of direct satellite to home services which may unfold. The potential viewing audience is every home in America. ▲





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# Portable Satellite Dishes

BY TIM HARRINGTON

One of the unique advantages of satellite transmitted television is that you can receive quality video and audio virtually anywhere you live providing that you have a clear view of the southern sky. Imagine the incredible leap in communications potential that this new technology offers man. Conventional TV can only reach approximately 50 miles to TVs using a standard receiving antenna. Until satellite TV became a reality, you had to rely on radio for news and sports and that was possible if you were located near enough to a radio station to receive it.

Portable dishes offer the traveler or camper the ability to receive satellite TV programming no matter where they wander as long as they bring a portable dish with them. Someday this communication ability will probably be two-way and you will be able to both SEE AND HEAR the person you are conversing with. If this sounds as if it will be far in the future, keep in mind that a distress beacon system has already been developed that will enable special satellites to locate a missing person virtually anywhere on earth if they have a special portable transmitter with them.

Your first reaction to this whole idea of portable dishes may be: why would someone want to take a dish along when they are presumably going on a camping trip to "get away from it all"? But, when you think about it, it's nice to keep up with the news and sports and, while you're at it, you might not want to miss that sports special that you were looking forward to.

Taking satellite TV with you on the road is a lot simpler than you might think. While a permanent dish with a sturdy mount should be set in concrete, this is not necessary or practical for portable systems. There is a surprising variety of portable satellite TV systems available with special mounts that lend themselves to portability.

The first thing that most people unfamiliar with portable satellite TV systems wonder about is the dish size. How in the world can you haul around a satellite dish with you when traveling? There are three basic ways to do this:

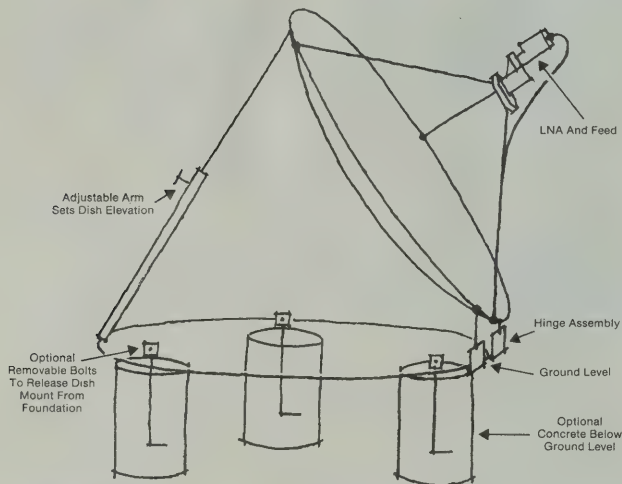
- Use a smaller dish
- Use a standard size dish that folds up
- Haul around a full size dish on a trailer

Each one of these alternatives will be discussed along with the tradeoffs of each in the next two articles on portable dishes.

## SMALL DISHES

Most permanently mounted satellite receiving dishes range in size from seven to 12 feet in diameter for good reason. Depending on where you live, this is the size necessary to receive a good picture on most satellites. The strength of each channel transmitted by satellite varies from satellite to satellite. Some are so weak that a 12' dish is needed

*Continued on page 37*



**Basic Mount** - Small dish can be anchored in concrete, yet be moveable through the use of release bolts and hinges.



**Portable On Roof** - A 6 foot dish mounted on recreational vehicle folds down during transit to reduce drag.

*How To Take  
All The Channels  
With You . . .  
Anywhere*

**Recreational Dish** - Watch your favorite shows amidst scenic grandeur, all made possible by today's smaller dishes and more powerful systems; photo courtesy of Wilson. At top, author's wife, Barbara, demonstrates the ultimate in portability with dish tied down to family car. (No, you can't get reception on the road, but it is easy to take dish with you.)









## Elmira Hoot lives with snow 365 days a year.

That's life in the TV snow belt. There's snow on soap operas. Snow on movies. Why, last year it even snowed right through baseball season.

That's what happens when you live too far from TV stations and cable companies.

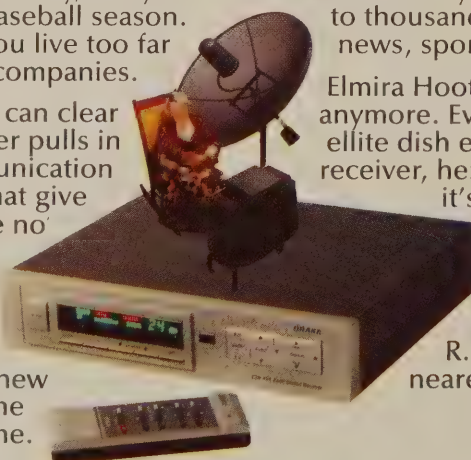
An R. L. Drake satellite receiver can clear up the snow. A Drake receiver pulls in TV signals direct from communication satellites. Crisp, clear, signals that give you a brilliant television picture no matter where you live and more entertainment choices than you ever thought possible.

What's more, the sophisticated microprocessor memory on the new R. L. Drake receivers locks in the sharpest satellite signal every time.

And when you use Drake's new microprocessor remote control system, you get armchair access to thousands of programs. Movies, music, news, sports and specials.

Elmira Hoot doesn't live in the snowbelt anymore. Ever since she got herself a satellite dish equipped with a new Drake receiver, her outlook has changed. Now it's always bright and clear.

Get the big picture from America's largest producer of satellite TV receivers. See the yellow pages for the R. L. Drake satellite TV dealer nearest you. Elmira Hoot did.



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## Portable Dishes from page 35

to receive a clear picture in some areas of the country while other satellites, such as Galaxy I, are so strong that good pictures can be received on dishes as small as 4.5 feet. Therefore, the sacrifice you make with a smaller dish in the four to six foot range is in the number of clear channels that you can receive depending on the part of the country that you are visiting. Most of the satellites over the western hemisphere have their transmitting beam aimed at the center of the United States. This beam is somewhat like a flashlight in that the intensity of the beam decreases the further that you move from the center. What this means is that in most cases the closer you are to the center of the U.S. the better a small dish system will perform. Although, with a small dish, all the channels available by satellite will not be clear and some will be watchable, a surprising number of them will be very watchable even with some sparklies or snow.

A dealer in your area should be able to tell you how well various size dishes will perform and approximately how many channels you can expect to receive clearly in your area. Remember, this will improve or worsen depending on which areas of the country that you travel to.

There are three basic types of mounts for portable dishes and variations within each type:

- Vehicle mounted
- Trailer mounted
- Free standing

### VEHICLE MOUNTED DISHES

Vehicle mounted dishes are usually mounted on the roof or rear bumper of recreational vehicles. The sophistication of the mount will determine how easy it is and how long it will take, to have your system up and running with a satellite TV picture, once you arrive at a site.

There are two types of bumper mounted dish systems. One type is permanently attached to the bumper and the other type is removed from the bumper and set up when you arrive at a site. The type that is removed will be discussed in the next section. Permanently mounted bumper dishes require that the rear of the vehicle be oriented toward the South so as not to block the dish's view of the satellites. Once at the site, this type of system usually must be manually aimed at a satellite.

You can get a system that is permanently mounted to the roof of an RV, sets itself up automatically and is much easier to use if you don't mind spending some more money. My favorite is the roof mounted system in which the dish is mounted on an electronically controlled motorized aiming system. When you arrive at a site, a push of a button commands the dish to fold up from a stowed position in preparation to be aimed at a satellite. The next step is to tell the system your location by keying in your latitude and longitude. Once the system knows your location it will automatically aim the dish at the desired satellite by simply pushing a button marked with the corresponding name of the satellite.

### FREE STANDING PORTABLE DISHES

This type of portable dish can be the most economical in that the aiming system is usually manual. The drawback is that you must remove or unload it from the vehicle and then physically set it up. Once it is set up you have to connect the cables, aim the dish to a satellite and then tune in the receiver. This can take anywhere from 10 to 30 minutes or more depending on how experienced you are at setting up dishes and how well designed your portable system is.

This same procedure must be repeated in reverse in order to stow the system for travel. This type of system will usually cost anywhere from \$695 to \$1995 depending on the sophistication and performance of the electronics that are selected.

Although they may seem more inconvenient to set up, there are some advantages to a free standing portable dish, out in a clear area. If you encounter T.I. (terrestrial interference caused by land based microwave transmissions) you may be able to move the dish to a site where a natural object or a building can shield the dish from the interference. (Please refer to Home Satellite TV January 1986, Fighting Terrestrial Interference.) In areas affected by T.I., setting up a dish as low as possible to the ground will many times minimize or eliminate the interference reaching the dish. A dish mounted up on the top of a vehicle will be more prone to interference. The nice thing about any portable dish is that if the area you visit is affected by T.I. you can drive a mile or two to another area that is free of interference.

### TRAILER MOUNTED DISHES

If you want excellent quality satellite TV reception wherever you go, you may want to consider a trailer mounted nine or ten foot dish. The sophistication of this type of arrangement can vary from pretty basic to a completely remote controlled trailer leveling system. A dish must be mounted on a perfectly plumb pole in order to track the arc of satellites in space. The easiest way to set this up is to have four motorized or manual jacks on the trailer, one on each corner. A bubble level can be mounted on the dish mount and the jacks can be adjusted until the trailer is level. Then the North/South orientation is set and finally the elevation of the dish. Although this takes a little while, with some practice you can have this type of first rate satellite TV system on wheels operating in less than 30 minutes.

Because it is not permanently mounted to one vehicle, you are free to haul it around in a pickup, on a trailer or even tie it on top of a car. You can also use it as a second dish for your family, or your primary dish for that matter. It's nice to have a second dish for the kids when they want to watch the Disney channel on one satellite while you watch sports on another satellite.

Another advantage of free standing dishes is that you can park your vehicle under a shade tree or in any direction you desire and then place the dish away from the vehicle

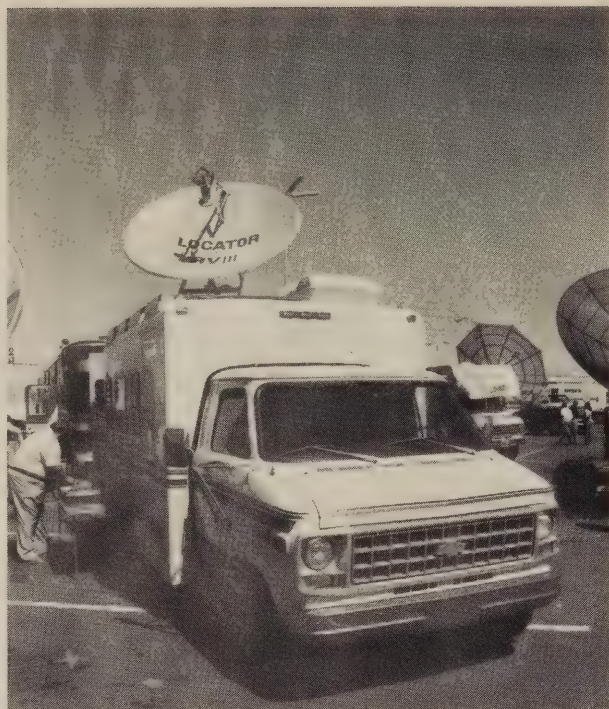
### LIMITATIONS OF PORTABLE DISHES

Remember I said that you can take portable dishes with you and have satellite TV almost anywhere. "Almost" means that there are some obvious and not so obvious exceptions to this.

The most obvious is that the dish needs a clear and unobstructed view of the satellite. It will not see through trees, hills, buildings, etc. If you are on the road and ready to set up camp, it would be wise to look for a high spot with a clear view of the southern sky.

Another problem for any satellite TV system is T.I. (terrestrial interference). Most T.I. comes from either the microwave relay towers used by long distance telephone companies such as MCI and AT&T, or radar found at airports and military installations. These relay towers criss-cross the nation so you will never know where to expect them. The good news is that they transmit in relatively narrow beams, usually about a mile or so wide so that if you experience a problem with T.I. at a site you can drive a short distance and get out of it. *Continued on page 38*





**Clear Reception** - Get up to 150 different channels "anywhere" you go during your vacation with a portable satellite antenna.

## Portable Dishes from page 37

If your portable system suddenly does not work well, you may find that it is T.I. rather than a problem with your system. There are various filters that you can buy for your system that will help minimize or eliminate T.I. while on the road. For more information on this subject you may refer to the article in the last issue of *HOME SATELLITE TV* (January 1986).

There is a limited amount of room for communications satellites in space because of the particular orbit in which they must be. Some satellites currently in orbit are being moved closer together to make room for additional satellites to be placed in orbit. There is concern that dishes smaller than nine feet in diameter (C-band only) may experience interference from satellites that are positioned two degrees apart in space as some will be in the near future. There is disagreement about this between industry experts with some saying that there is little likelihood of a problem while others say that there may be a problem. One fact that is clear is that no one will really know until some satellites are moved closer and real-life testing can be done.

### SELECTING A PORTABLE DISH

The criteria used when selecting a portable dish is very much the same as that considered when selecting a full size dish. However, there are some important differences. Portable dishes will have to be durable to stand up to the rigors of travel, especially free standing dishes that will be handled frequently when being loaded and unloaded from a vehicle. Metal or mesh dishes are, in most cases, fine for large dishes that will not be handled but for small portable free standing dishes, I prefer fiberglass dishes because they are flexible and more forgiving than metal or mesh dishes. Once a one piece metal dish is dented, it is practically im-

possible to return it to a true parabolic shape necessary for good satellite TV reception. Although mesh also can be damaged, at least sections of it can be replaced. Sectional metal dishes are a good second choice because individual panels can usually be ordered from a dealer to replace a section that may be damaged. As with all dishes, the bottom line is the amount of signal that it gathers from the satellite in space. Therefore, as always, I recommend that you check the performance of a small dish before you buy it.

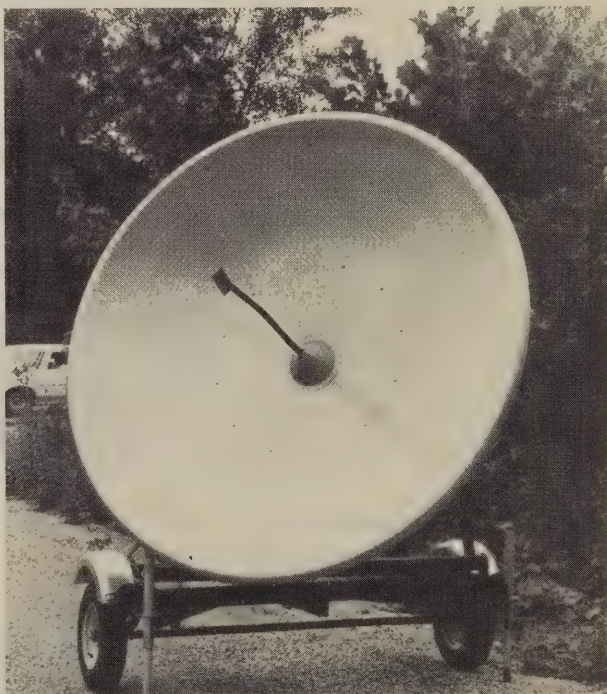
Vehicle roof top mounted dishes should have a sturdy mount that can withstand high winds that will be encountered on the open highway. The more sophisticated roof mounts can fold the dish down into a position that minimizes wind resistance when traveling.

### DISH SECURITY

Because the dishes mentioned in this article are portable and easy to move, they are also easy to steal. If you purchase one, I recommend that you immediately consider a method to secure the dish from theft. An alarm will do little good if you are in a wilderness area where no one is around to hear it. Although a locked chain is a good step, a welded and locked steel clamping bracket is much better. A local welding shop will probably be able to help design a simple and inexpensive locking bracket to secure your dish.

We have just begun to explore the subject of portable dishes. In the next article we will take a look at a remarkable lightweight portable dish that is nine feet in diameter but folds up like an umbrella for easy transportation. In addition some of the more technical aspects of portable dishes will be covered along with tips on what to look for when buying a small dish and ways to maximize small and portable dish performance.

*This article is an excerpt from a new book soon to be released called "Understanding Satellite TV" by Tim Harrington. ▲*



**Dish On Wheels** - This larger, though still portable, dish is ideal for those who want better reception while on the road.





**Dish On The Range** - Taking satellite TV reception with you on vacation provides best of two worlds.

# MOBILE TVRO

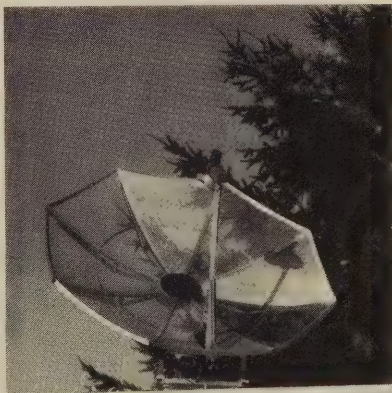
## *Recreational Vehicles*

### *Should Now Carry TV Program Guides*

BY SCOTT MEHNO

**M**obile home owners have suddenly discovered satellite TV. Satellite dishes designed for recreational vehicles have shown a major increase in sales in 1985. The reasons for the sudden popularity are due to the improvements in the design of mobile dishes. Most of the RV antennae now weigh less than a hundred pounds and are constructed so that they can be stored in the recreational vehicles themselves. Another improvement in RV design has been a mechanical activator attached to the unit so that the owner does not have to open and fold the antennae manually. By utilizing operational motor mounts, an owner can operate the antenna from inside the vehicle. Reception quality has also improved with the small dishes. A 60 or 70 degree LNA does the trick for an RV dish.

**Motorized Lift** - This dish automatically moves upward and tracks right and left so viewer can find satellite without leaving the comfort of the recreational vehicle.



Many "dealers on wheels" are now opened for business, travelling through the nation's campsites and trailer parks explaining and demonstrating this new phenomenon. It is not just the small portable dishes that can be used on RVs however. Many of the heavier trailers are now designed to incorporate a dish geared more to their size. A 30-foot trailer, for example, can hold a six-foot dish, which means a reception capability that would equal that of any backyard installation. The key in installing a dish that size is leaving room for the other accessories an RV owner may also want on the trailer.

What lures these heavy trailer operators is the entertainment value satellite TV can offer them. Long trips across the country can often be brightened up by the equipment. Many of

*Continued on page 40*



## Mobile TVRO

the units come with a DC converter which enables the user to use the dish away from the vehicle as well. Countless rec operators only use their vehicles during the summer months, which means the satellite antennae can be transferred to their backyards if necessary, the other eight months of the year. Another advantage of the RV dish is that many are designed with remote control. This enables the homeowner to keep the antennae on the trailer and still enjoy satellite TV from inside the house.

Statistics show that there are nearly 10 million recreational vehicles currently in operation throughout the country. Industry estimates indicate that dish sales to RV owners have tripled in 1985. Brian Foster, head technician for Video Satellite Communications in Northern California, feels that the RV owner's attraction to the industry is a natural step in this high tech age. "I have a saying, 'In today's

world the biggest toys always win.' RV owners are usually people who follow the electronics industry. They see that satellite TV is another great convenience for them, so why not have it on their trailer."

Foster also points out some of the trouble areas, however, when installing a trailer mount. "By law your dish can't go wider than eight feet. When installing an antennae you also have to be careful that you make room for other electrical units you may want to put up there. An air conditioner, for example." Foster says that some customers still prefer the manual dish, but for the most part the automatic drive is what has made the RV transformation to the satellite world.

One key factor to this new market is the limited competition among companies manufacturing RV dishes. One of the first companies to design dishes specifically for the motor home industry, went out of business this past summer. One of the most popular mechanized dishes is designed by Travel Sat of Vancouver Washington. A 100 lb.

antennae, it's now manufactured in both fiberglass and mesh. Many RV owners interested in purchasing a satellite dish often ask the same questions. The following is a checklist you may use when shopping for one of these travelling wonders:

Many consumers want to know the clearance of an antennae when it is in the resting position.

No antennae should be more than two feet from the top of the trailer when not in use. This insures the RV will have total clearance under bridges and tunnels when travelling.

Can the weight of an antennae effect gas mileage? It certainly can. That's why most experts warn against installing any dish over 100 lbs. This will prevent the excess drag that can make the gas gauge hit 'E' a lot faster.

Can you watch satellite TV while actually travelling on the road? Unfortunately not. Reception would be constantly interrupted due to interference and the splitting of the signal.

When parking your trailer to operate your satellite dish, how do you know which way to aim it? A common compass will tell you which way to aim and most dish manufacturers provide a booklet detailing which satellites are where, as well as, information on the proper azimuth, elevation, etc.

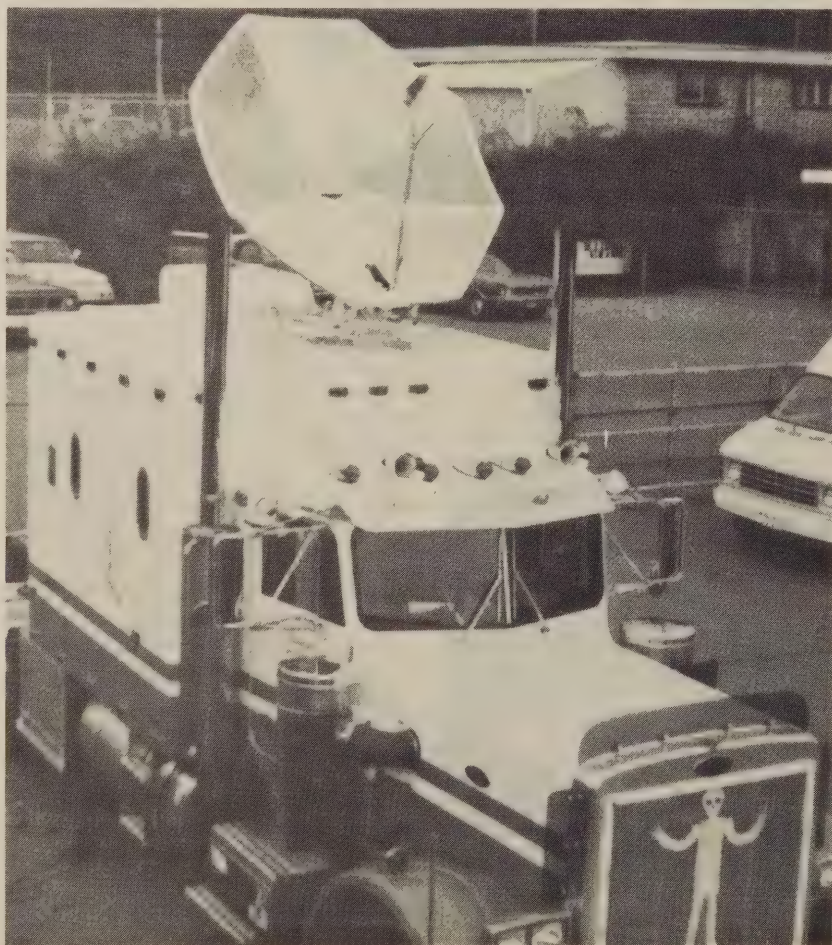
How many channels can an RV dish get? The number varies, of course, depending on the location and quality of equipment you're using, but most antennae specifically designed for vehicles can guarantee at least a 70% maximum capacity in most areas.

Any other questions you may have about this new wave in dishes may be directed at your local satellite dealer. But another interesting twist to dishes on wheels is that it has also caused motor home professionals to start selling dishes themselves. Now this doesn't necessarily mean that your local car dealer will soon be hawking dishes beside that Chevy, but one of the nation's largest motor coach chains has dived into TVRO head first. Beaver Coaches has made a deal with one manufacturer to exclusively install dishes on their vehicles for customers who request TVRO. The largest number of Beaver Diesel vehicles are purchased by senior citizens.

More and more consumers of all ages will be taking to the nation's highways with a satellite system this spring. Their suitcases packed, their sleeping bags ready, and one new item, the local TV guide. ▀

### Just Trucking -

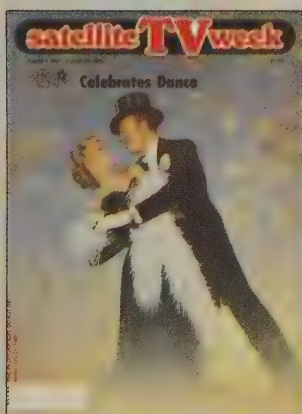
*Satellite dish on semi provides entertainment for driver wherever he pulls off the road.*





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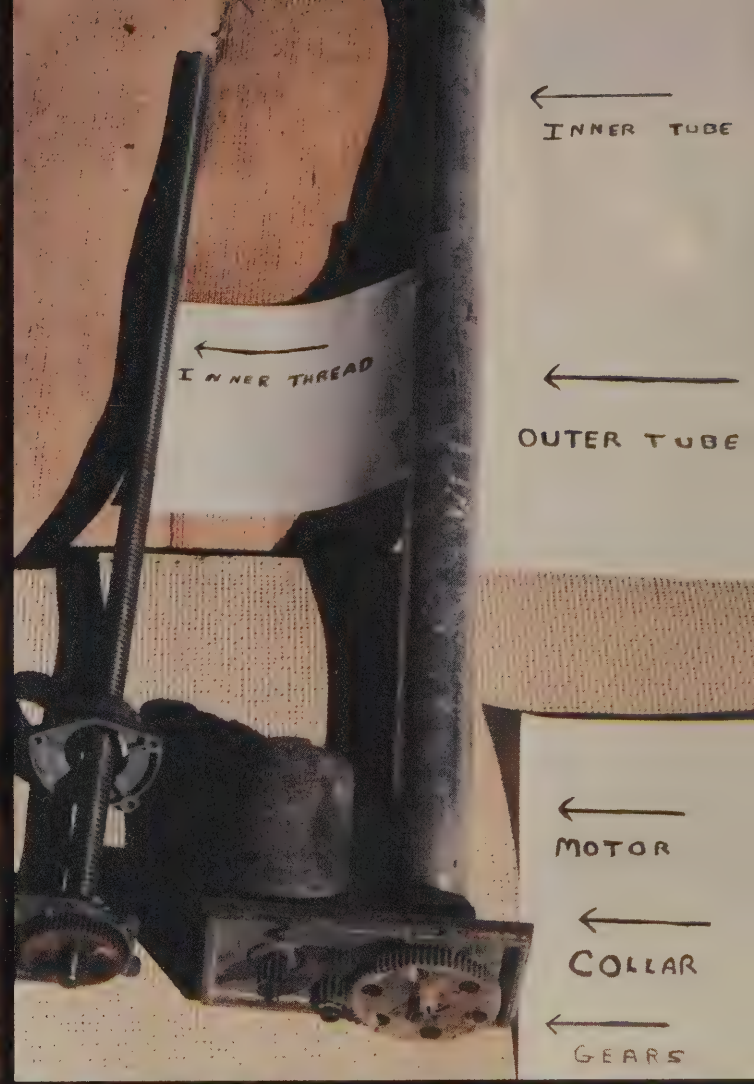
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# The Ins And Outs Of ACTUATORS

## What You Should Know About Antenna Positioners

BY TIM OLIN

**B**e honest. If you overheard the following conversation you wouldn't know exactly what is being discussed.

"What kind of motor does it have?"

"It's a 24 volt DC permanent magnet. It's a half a horsepower."

"What kind of torque does it put out?"

"It's about a hundred inch per pound minimum. The thing only draws about an amp."

"I heard that the transmission is a differential planetary with a reduction of 123:1."

"Yeah. That's true. It uses a machined, bronzed acme nut and dual timken tapered roller bearings."

O.K. I confess. I have never heard anyone talking about actuators, antenna positioners, dish drives or whatever you want to call them, in those terms. Those are true technical terms that refer to actuators, but are more confusing than enlightening.

Enlightenment is the goal here. Some basic knowledge about actuators is important when you want to purchase one, diagnose a problem with one or to repair one. At first there were linear actuators and now there are horizon to horizon actuators. Each one is just a little bit different from the next. However, there are two basic components that comprise an actuator, whether it be linear or horizon to horizon. The two are the drive and the controller. The controller is the high-tech, glamorous part of the actuator and unless you have the schematics, parts and

background in electronics is the most difficult to understand from a technical aspect. The jack is the drab industrial side of it and will be the focus of discussion.

Linear actuators are motorized arms that aim the dish at a particular satellite. Horizon drives are those that are part of the mount of the dish and usually rotate it along a circular gear drive. This article is primarily about linear drives. The pros and cons of linear vs. horizon drives are material worthy of an article in itself.

In essence, the controller sends messages to the drive or jack, telling it to move to a certain position and to stop there. These controllers range from stand alone units that have just east-west buttons to all-in-one units that contain both the receiver and the controller for the positioner. Some are built to interface with a receiver and not only control the mover, but also control the channel selection and polarization of that receiver.

Basically, the drive or jack consists of: 1) mounting hardware 2) seals 3) inner thread 4) gears 5) outside tube 6) inside tube 7) clutch 8) terminal strip 9) sensors 10) motor 11) limit switches 12) motor housing with collar.

1) Most actuators have the same, basic mounting hardware, consisting of two mounting attachments. One at the dish and one at the mount of the dish. The bracket on the jack in most cases is a two-piece clamp held together with two bolts. Some adjustment can be made by sliding the clamp up and down on the jack. Generally, this mounting hardware is provided as part of the actuator package. Once in place there are few problems with the mounting hardware, but they can work loose after being mounted for a period of time. Occasionally, they should be checked as the nuts and bolts of the matter may vibrate loose. They should also be checked to make sure they aren't corroding or that they

haven't moved out of place. Pay particular attention to the mounting instructions provided with the actuator. Improper mounting can cause the dish to be dumped or driven into the ground and the arm itself can be bent when put at too acute of an angle.

2) The seals are very important in providing weather protection, keeping lubricants inside the jack, keeping out dirt and in guiding the inside tube. Seals are made of plastic, of stainless steel, of nylon and of various other materials. These seals do wear out over the course of time and may need replacing. Quite often, when the insides are not protected by weather boots and drain holes, moisture can enter and when combined with freezing weather can cause the seals to warp or to bind. Friction of the screw jack going in and out can also wear those guiding seals out. If you have play from side to side in the jack, there is a possibility that those seals are shot and will have to be replaced.

3) The screw or thread is actually just that, a long threaded rod with the purpose of screwing in and out of the tube through a nut on the inside. They range from fine thread to coarse and the more threads, the more times the screw turns. For basic purposes there are two types of these screws: a ball screw and an acme thread. In terms of numbers, the most common is the acme thread, because of cost and ease of manufacture. When the thread turns inside that threaded collar or nut, the tube moves in or out.

The ball screw works on the same principle as the acme, except it has ball bearings inside the threads to reduce friction and to develop the same force as the acme with less motor. The acme is more susceptible to binding up or to rusting when not used for some period of time.

4) The gears are made from plastic, from solid steel and from nylon. There are various gear ratios that may or may not mean anything to you as the consumer. The actual consistency of the gears themselves is important. Plastic is plastic and when gears are torqued or a great deal of pressure is exerted on them something has to give. Which goes first, plastic or steel? In the world of miracle plastics that may be a trick question. However, if your actuator does not go around and around, you may have stripped the gears and replacement is necessary.

As with any type of gears, gear ratios play a part in the effectiveness of the system. Low gear ratios may be

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**Understanding Linears** - Whether you're making a purchase, diagnosing a problem or repairing, you need the basics. Top right shows the parts of the arm. Below that is the motor and shroud. Bottom left is the dish attachment coupling.

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# Actuators

Continued from page 45

very good from the strength aspect, but may cause the actuator to move slowly. A highly geared actuator is fast, but gives up power. Some of the older actuators did not use gear to gear drive, but used a belt to drive the gears. Needless to say belts wear out and break and some of those manufacturers now offer a conversion of the belt drive to a gear drive.

All of this emphasizes the importance of matching the actuator with the dish. If you have a big, heavy dish, you most certainly do not want an actuator that won't handle it. In the same light you do not want actuator overkill. To stick a great deal of money into a mover that is more than adequate is fine if you have it. Match the strength of the actuator to the type of dish: mesh, metal or fiberglass. Also, take into consideration the environmental conditions the actuator will have to perform in, such as ice, snow and strong winds.

5) The outside tube holds the screw and seals and guides together and is generally constructed of aluminum or of stainless steel. Some makes advertise that their actuators are hermetically sealed with a pvc dip process, while others have a weather or corrosive resistant coating, such as a urethane paint. The bottom line is that it should be weather resistant and guard against corrosion.

6) The inside tube moves in and out as the screw turns driving it out or drawing it in. It, like the outside tube, is constructed of aluminum or stainless steel and is treated to protect against corrosion. It may be anodized or weather treated some other way. It is also known as the extension tube and surrounds the inside thread.

7) The clutch in an actuator acts similar to a clutch in a car or a truck. It can be a slip clutch that releases when the load becomes too much or when the screw jack reaches the end of its travel. It engages to move the jack and can act as a limit.

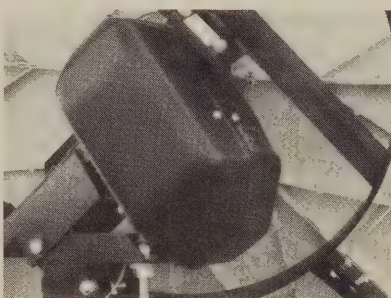
8) The terminal strip is the place where all the wires are hooked up. Most have screws that secure the wires to them so clips can be attached. In most cases the terminal strips are fairly easy to get to and work with. Instructions should clearly point out which terminal is for the sensors and which are for the motor.

9) The way you know where an antenna is at, is by the position indicator

on your controller. The original signal comes from sensors within the housing of the actuator. They send back information to the actuator control. One way this is done is by using magnets and is called Reed Switching. As the magnets rotate by the sensor a pulse is emitted and the sensor picked up the pulse. The pulses then indicate how much each gear has moved and in turn how far the antenna has moved. This is probably the most widely used form of sensing.

Other sensing units in use include the Hall Effect Transistor, Photo or Optical Coupler, Tuning potentiometer, Miro Switch, and one used by very few manufacturers is the Current Loop.

The Hall Effect is susceptible to outside noise and electrical interference, so its use is becoming limited. The Tuning Potentiometer method is in use with many of the popular actuators today, while the other two methods have seen limited use.



**Covered Mount** - Plastic shroud provides necessary weather protection for a modern horizon to horizon motorized actuator.

10) The motor provides the power for the actuator and most actuators are using 36 volts. DC for power. There are a few that don't, but very few and many older ones that used something other than 36 volts. The motor should be able to start the motor at zero volts, and should delay the current when it is reversed so that the motor comes to a complete halt before starting back up. There are not many actuators on the market that go the extra mile in regard to the last aspect.

The best motor circuit possible controls the starting and stopping of the actuator in a manner that reduces whiplash to a minimum. An example of this is the Gentek 7000. It starts out very slowly and when it comes to the satellite will move past a little bit and then will come back and settle on the satellite. When an actuator starts up with full power and comes to com-

plete and sudden halt it causes rebound and stress on all parts of the system. A good motor will also automatically adjust for varying loads, such as when the wind is blowing strong or there is a snow or ice load on the antenna. It will adjust for power surges or voltage drops.

11) Built-in limits in actuators prevent more problems than could be discussed in these few pages. Limits keep the actuator from going too far causing the jack to unscrew and the dish to crash or from running too far in and becoming stuck. Limit switches may shut the actuator completely off or may activate a light that indicates that it has reached its limit. Setting the limits of an actuator vary from brand to brand and no matter how the limits are set, it is of utmost importance to do it correctly.

Incorrect setting of the limits may result in not getting the full satellite belt, or in over-driving the unit or in having to go completely through a routine again to program the unit. The bottom line is to read the instructions first and then follow them.

12) The motor housing is the protective case surrounding the gears, terminal strip, and sensors. Most are sturdy and have easy access to those inside parts.

Knowing what to look for in an actuator jack may save you time and may save you money, but most of all it will probably save you a great deal of grief. Take the time to study the specs on an actuator and to ask a few questions about the drive you will be getting. It can be a smooth drive or it can be a bumpy one, the choice is yours. Many actuator jack problems can be solved at home with the right bit of knowledge and a few basic parts.

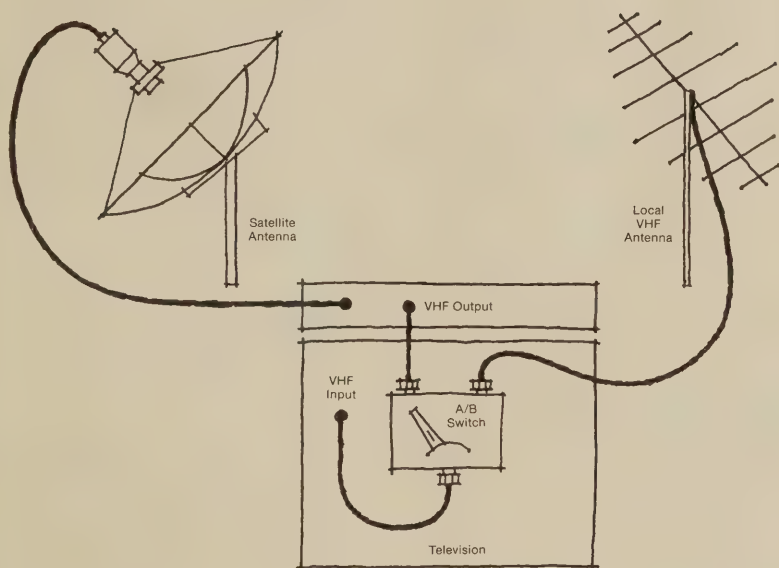
Other things to take note of when purchasing a positioner are weather boots, length of jack, and adequate drainage for moisture. Make sure the positioner has weather boots that cover the motor housing and the place where the tube goes in and out as shown in photo #3. Look for drain holes in the housing and collar. Moisture can get inside those places and need a place to get out. Not every positioner will have them and if not you will have to drill them. Actuator jacks come in various lengths from 18 inches to 52 inches. The measurement comes from the length of the inside tube when extended.

I do hope that I have provided you with a start in understanding the ins and outs of actuators. ▀





## Avoiding Local Interference



*Once properly installed, a home satellite system should give you years of service. You can help insure this by observing a few basic maintenance and tune-up procedures. (These will also improve the performance of your system!)*

Satellite signals travel 45,000 miles just to get to your backyard. It's usually a pretty safe trip. No drifting off channel. No weather problems. Every now and then the sun might get too direct, or maybe a little T.I. from some phone company gets mixed in there, but most of the time the trip to your dish is a cake walk.

Once the signal gets into your receiver, you'd think it was home free. That's why it's so ironic that the path from your satellite receiver to the tele-

vision can be the most dangerous one of all. Although they are often overlooked, local TV broadcasts can be a major source of interference that many satellite system owners encounter.

Many TV stations broadcast their programs on VHF channels 2, 3, or 4. Your satellite receiver VHF output can be set to channel 3 or 4. When these signals get mixed there can be problems.

### CO-CHANNEL INTERFERENCE

Let's say there is a TV station in your area broadcasting on channel 3. When your system is installed, the receiver output is also tuned to channel 3. Even when you disconnect the local TV antenna, some of the local signal still gets into the tuner to interfere with the satellite signal. It can enter through a poorly shielded coaxial ca-

ble or through the TV circuitry. This type of interference, called co-channel interference, usually appears as a pattern of wavy lines superimposed over the picture. If the interference is strong enough, it can even appear as a second picture.

You can correct this problem in several ways. Since you will probably view both the local channel and satellite channels, the first step is to switch the satellite receiver output to the other channel (in this case, channel 4). This will help to isolate each signal, because each one is now occupying a separate channel. In many cases this may be enough to eliminate most of the interference. However, some interference may remain. This is because the local channel on channel 3 is bleeding into channel 4, the satellite channel. This is called adjacent channel interference.

### SWITCHES AND COMBINERS

To clean up the picture further, try connecting an A/B switch between the local antenna and satellite receiver, and the TV input. This provides excellent isolation between the signals, and should clear up the interference completely unless the local channel is very strong.

A/B switches come in various qualities. For a few extra dollars it is a good idea to purchase a higher quality unit because of the additional isolation and durability. A locking A/B switch can also prevent one source from being viewed without the key.

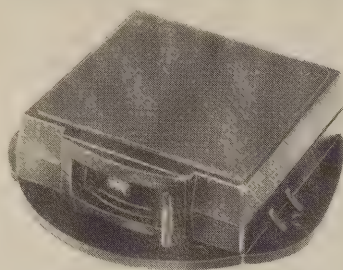
Video selectors are more elaborate switching stations that allow selection of several TV sources (satellite, local, VCR, etc.) by two or more televisions. Some of these units even feature infrared remote control. Video selectors help to straighten out the maze of cables that are often part of a multiple-component entertainment system, and provide excellent isolation between TV sources.

A channel combiner can provide this same function for two or three TV sources. It isolates adjacent channels and combines them on one coaxial cable, with the added benefit of not having to switch a switch when you wish to select local, VCR, or satellite TV.

Many satellite receivers also provide A/B switching as a built-in fea-



Continued from page 47



**A/B Switch** - It can clear up interference between local antenna and sat receiver.

ture. The local VHF antenna is connected to an input on the back of the receiver. When the receiver power is turned off, the local channel is sent to the receiver output. This provides for excellent isolation between signals, and eliminates the need for an external A/B switch.

## MODULATORS AND MONITORS

Unfortunately, even the best A/B switch may not provide sufficient isolation if the local station is very strong. This is often the case if the station's transmitter is within several miles of your home. The signal may be so strong that it bleeds over into the adjacent channels with enough power to be watchable on those channels as well as the intended channel.

Another condition that is particularly difficult is when your home is within range of two stations broadcasting on channel 3 and 4. Like the song says, "No where to run, no where to hide". Cases like these call for more drastic, and often more expensive measures. You have two options:

1) Use an external modulator to tune the satellite signal to an unused VHF channel with no adjacent channels such as channel 2 or 5, or a high-band VHF channel such as 6-13. Low-cost modulators are available from several companies for between \$75 and \$150.

2) Use a video monitor or combination TV/Monitor to watch satellite TV. The baseband signal that the monitor uses is not affected by local TV signals. Most television manufacturers currently produce monitors and TV/Monitors. The prices are usually between \$100 and \$200 higher than televisions of equal size. Personally, I prefer TV/Monitors, because they offer the versatility of being able to tune to

all the locally broadcast and cable channels as well as provide the best picture for your satellite system through the baseband video input.

## CABLE AND CONNECTORS

No matter what your local TV situation is, one of the best ways to assure that you get the best satellite pictures is to use only high quality coaxial cable and connectors in the system. The superior shielding assures that stray signals and noise will not enter the system.

Improperly shielded coaxial cable acts as an antenna, picking up any radio or TV signals that are present. This is especially true where long runs of cable are required in the system. The other big benefits of using high quality cables is that there is a minimum of signal lost in the cable. In systems using multiple TVs, splitters, remote sensors, and line amps, this is especially important. When it comes to coaxial cable, you really do get what you pay for. If you are purchasing a new system, make sure that the price includes high quality cable with 100% foil plus braided shield of aluminum or copper.

## START WITH THE BEST PICTURE

How can you tell if it is local TV signals that are interfering with your satellite picture? Several things to consider are listed below:

1) Is there a pattern of wavy lines on all satellite channels that doesn't change as you change channels or move the dish to other satellites? If so, you probably are not experiencing Terrestrial Microwave Interference (T.M.I.). The interference is probably being caused by a local source.

2) Does the interference go away when you disconnect all other components from the system except those required for the satellite picture? If so, reconnect each component to the system until the interference reappears. This will help to identify the source of the problem. Install an A/B switch between the satellite receiver and all other system components. This should clear up at least 90% of the problem if local interference is the cause.

3) If you view the satellite picture on a video monitor, does the interference go away completely? If so, the source of the interference is definitely from a local source.

After you have identified the source of interference, there are several ways to deal with it. I have covered all the easy ones here. The other solutions such as using special filters to eliminate the interfering signal or confine it to a narrow band require special equipment and knowledge that your local satellite TV antenna dealer can provide. Make sure that you try the easy solutions before going to the added expense of a service call.

## GET THE PICTURE

The whole idea is to get the best possible picture from both the satellite system and the local TV antenna. Many of us have never had the benefit of clear interference-free television. With a satellite system, however you should be able to watch the best quality video available. ↗

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# UPLINK!

## *United Video's Chicago Teleport Feeds The Satellites*

BY JIM VINES

**N**o matter where I've installed TVROs—from Tuktoyaktuk to Tegucigalpa—it always seems that I run into those *Em-piiire* commercials on WGN-TV. And when I do I'm reminded of my good friends at United Video's famous Chicago Teleport, which isn't located in Chicago at all.

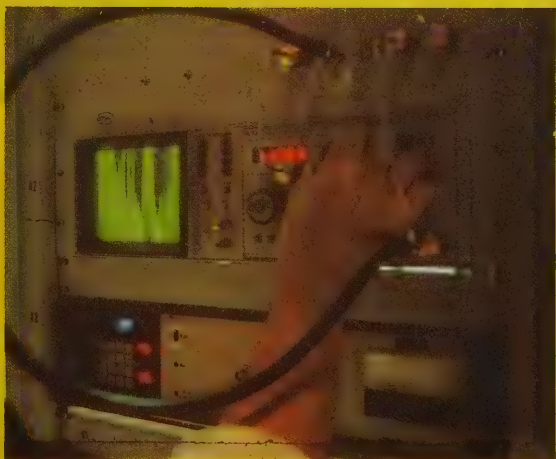
Situated amongst the cornfields 30 miles south of Downtown Chicago, the U-V teleport plucks WGN-TV out of the air with an array of Ch. 9 "yagi" antennas, processes the WGN signal, and then "uplinks" it to the Hughes Galaxy One satellite for re-sale to cable TV systems across the USA.

After one look at all of the antennas in United Video's "backyard", it's apparent that WGN isn't the only service being handled. There's SportsVision which you can watch evenings and weekends on Satcom F4, Transponder 9. When SportsVision is off the air, the big 11-meter (37-foot) Harris Communications antenna can be aimed at other satellites for temporary uplinking.

When SportsVision is ready for nighttime "sign-off", they simply phone the U-V Teleport and say "turn it off". And Jeff Wadolny, Gary Justin or whoever answers just

*Continued on page 53*

**Sending TV Signals To The "Birds" - Harris Communications' 37 foot dish, located outside Chicago in a "teleport," uplinks SportsVision to the Satcom F4 satellite. High-Tech TV transmitters (bottom left) process the signal for transmission to the "bird" which then beams it to home satellite receivers all across North America.**



**Night Transmission - The huge 10 meter Andres Corporations dish uplinks WGN-TV to Galaxy 1 (above). Actuators (left center) position the dish while technician (below left) checks subcarriers with a spectrum analyzer.**



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saunters back to where the "SportsVision" HPA (for high power amplifier) is and "puts it to bed".

So what happens with the "SportsVision" dish early in the day before SportsVision goes "on the bird"? During the aftermath of the tragic Mexican earthquake, U-V contracted with a Chicago TV station (WCIU, Ch. 26) that has a large Hispanic audience to "downlink" (receive) live news from Mexico City via the Mexican satellite Morelos 1.

As an aside, we should point out that even "getting" Morelos 1 in Illinois is a major accomplishment. Even with an 11-meter dish that was "proofed" by professional installers to a surface accuracy of plus-minus 1/8 inch peak-to-peak deviation from absolute perfection.

OK, just what kind of "TVRO system parameters" does it take to get Morelos out amongst the Illinois cornfields? One afternoon recently this writer and Engineering Manager Bill Hartanovich considered all of the "knowns" and were able to "back into" a "best-fit" estimate of Morelos' signal strength at the Teleport site. It's about 17 dBw, or about one eightieth (1/80th!) of that with which a typical transponder on Galaxy One—at 36 dBw on average—irradiates the ground.

That's because Morelos' footprint is "boresighted" on Mexico.

What did Morelos' video look like? The video off the transponder being received for WCIR's later re-use was grainy. The color was particularly grainy and washed-out looking. There weren't any "sparklies" since the Intelsat-style "half-transponder" format the Mexicans were using (17.5 MHz compared to the usual 36 MHz bandwidth) had the effect of boosting "system sensitivity" by about 2.2 dB. But the trade-off (given our weak 17 dBw "footprint" at the Teleport) resulted in severe "chroma dropout".

This is the kind of job that calls for digital video restoration equipment—about \$50,000 worth. Equipment like this has enough "smarts" to compare samples of chroma on successive "field scans" and "fill-in" the "dropouts" where "statistical averaging" indicates that something is missing.

The end product—while still not as good as the stronger, wider bandwidth domestic signals—is surprisingly good; and an almost miraculous improvement over the "unprocessed" signal.

The "SportsVision" dish is also used for temporary uplinking. For instance if President Reagan were in town; or

---

***"The 'SportsVision' dish is also used for temporary uplinking - for instance, if President Reagan is in town or if there is a 2-way hook-up for ABC's Night Line."***

---

if there was a two-way hook-up between (for example) ABC's Night Line and a particular physicist of the Fermi Lab.

WGN is United Video's best-known programmer. I've watched "Leave it to Beaver" while sitting on the roof of a

Catholic School in Tegucigalpa, Honduras as well as the Harlem Furniture ("Call HUDson 3-2700") commercials. During the summer months I can count on watching Harry Carey cheering for the "Cubbies" at job sites from Gold River, B.C. to Port Siding, Manitoba.

As noted earlier, United Video takes WGN directly off-air with a four-bay array of Channel 9 "yagis"; next they enhance WGN's video; and then they "cram" it onto Galaxy One, Transponder 3 with 24 other "subcarriers". These include a range of audio services from "office" to rock music, news, facsimile, and data. By packing a full house on Transponder 3, United Video is able to "pay the rent" to Hughes Communications, owner of Galaxy One.

Notice that there are *two* WGN monitors rack-mounted side-by-side. One of these shows the off-air signal from WGN's Sears Tower transmitter; while the other shows the WGN signal after its round trip to-and-from Galaxy One. The round-trip from the Teleport to Galaxy One and *back to the Teleport* is about 48,000 miles. All electromagnetic

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***"I've watched 'Leave It To Beaver' while sitting on the roof of a Catholic School in Tegucigalpa, Honduras, as well as also seeing the 'Harlem Furniture' commercials!"***

---

radiation (radio waves, VHF, UHF television, microwaves, visible light, x-rays, etc.) travels at 186,400 miles per second, the speed of light, also known as Einstein's "Universal Constant".


So the 48,000 mile round trip to G-1 and back to Monee, Illinois takes a tad more than 1/4 second. The fun really starts during baseball games when the batter hits the ball. With the sound from both WGNs simultaneously "on", one hears the bat strike the ball twice: "click-click". Listening to two Harry Careys singing "Take Me Out to the Ballgame" is an experience!

Recently U-V installed a pair of 4.8m (16 foot) Paraclipse dishes with horizon-horizon tracking. These were selected to monitor SportsVision and WGN with "CATV" size antennas.

There's nothing like watching satellite TV with a large, *high quality* antenna and an equally high quality receiver. The best eight-foot TVRO system simply can't "play" on a 40-inch monitor, but a top-flight 16-foot system renders big-screen video that's, well, scintillating.

During one of my evening visits to the United Video Teleport, I saw the *Empire rug* commercial for maybe the four-thousandth time. And I wondered about all of the good friends I've made in the Bahamas, in Belize, in Honduras, and across the High Arctic. If they were watching what I was watching, it was with an antenna I had designed and installed for them. "From Tuktoyaktuk to Tegucigalpa . . ."

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This writer is particularly thankful to several others among the U-V Engineering staff for their help in preparing this (and future) HSTV articles. They are: Al Stern, Director of Engineering and Operations; Gary Justine, John Bimrose, Ron Anderson and Ron Burns. 



BY MICHAEL J. FENNELL

*Zoning problems have been a concern for dish buyers across the country. Unreasonable regulations have restricted the free use home satellite receivers in a number of cities. This article examines one such account.*

*It must be understood, however, that help is on the way. Recent court rulings recognize the rights of individuals to set up home satellite TV receivers. In addition, the FCC is expected to soon rule on the subject of unreasonable zoning laws. (See related article by Dick Brown.)*

**W**hat would you do if your freshly-minted satellite dish was condemned by your local government and you were ordered to remove it from your yard for failure to comply with your local building commission's requirements?

It has happened.

If you live in an area that has no ordinance, you have no problem . . . Yet. But the times they are a changing and many villages and cities are not changing with them as fast as we would hope. When new ideas come on the scene there are always people in positions of power who are not ready to accept the changes. Not to mention people who resent change, whom the power people represent. As a result, restrictive ordinances are becoming more common and more restricting. There seems to be a race to get them on the books. In the race sometimes people stumble over the wording of the rules or stumble through the compliance and enforcement procedures. The result is confusing for the dealer and the customer. Sometimes even for the village officials. (Sometimes the Village officials create the confusion and carefully nurture it until it ripens into chaos. As Chicago's late Mayor Richard J. Daley once said, "the police are not here to create disorder. They are here to preserve disorder.") Here we preserve an example of disorder. Consider the case of Ray.

Ray was a quiet man, partially disabled, who watched a lot of TV. He was interested in satellite television and inquired of his Village building inspector, with whom he was on a first name basis, (it's a big city with a small town atmosphere) whether it was possible to install a dish in his yard. He was told that the village had no ordinance and he was advised to wait until an ordinance was passed. Ray's second mistake was in following this advice. His first mistake was in asking

## BATTLING CITY HALL

### *The Anatomy Of An Installation Ordinance*

**Officially Unfair** - Home owner put up the taller antenna for ground station TV reception 10 years ago with no complaints. Within weeks of installation, however, the city ordered him to remove smaller dish!





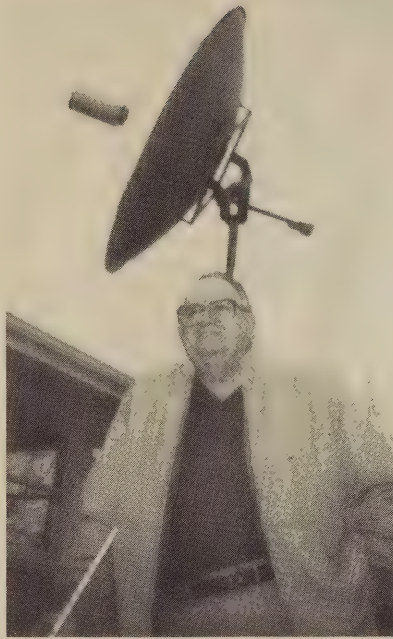
the fox how the chickens should be guarded.

Ray's first inquiry was in June of 1983. He asked again in January of 1984. And March. And May. Each time he was given the answer that the village was developing an ordinance and was instructed not to install a dish until it was passed. The ordinance was dated May 23, 1984 and was passed into law June 4, 1984. Now he had something to work with. To comply with. (Oh, alright, with which to comply, work, etc.)

The ordinance defined a satellite dish as an "accessory structure." This meant that a permit must be obtained prior to installation. The permit application must be accompanied by a to-scale drawing of the lot showing dimensions of the lot and of the proposed structure. In duplicate, of course. (Don't laugh—my village requires 12—Count 'em—TWELVE! copies of the plot of survey.) Height measurements must be made from the highest point of the antenna to the bottom of its base. Yet no height limit was mentioned, so who's measuring? We can't put it on the roof, but we can put it on a pole. The dish was limited to ten feet in diameter, neutral color, no roof mounts and no advertising other than manufacturer's name or emblem not more than 2" in height. And, by the way, the dish must be kept not less than 10 feet from any lot line, as long as you don't let it wander out of the back yard. There's more, but you get the drift. This is one of the reasonable ordinances.

Around January 1, 1985 Ray bought his satellite system from a local dealer who installed the dish on a tall mast overlooking Ray's house, which just happened to be between his back yard and the stationary satellites. The satellites orbit directly over the equator which, as most people have learned, is somewhere south of the U.S.A. If your house is on the north side of the street and you can't mount the dish on the roof, what choice have you?

The installation worked and Ray was happy until a few weeks later when the village inspector told him he had to take it down because he didn't have a building permit. He had to have a permit if he wanted to keep his system. Ray did what any red-blooded American would do. He called his dealer and told him to shag over to city hall and pay the piper the \$50. (Don't look so surprised. In my neighborhood you pay \$100 for the privi-



**Ray And His Dish -**

*A hard fought battle.*

lege of spending an evening in front of the zoning commission. And they have previously written to all of your neighbors and invited them to put in their two cents worth. And you can't get your money back if you lose. Getting a dish in my area is difficult in the best of times. And my neighborhood has seldom SEEN the best of times.) The dealer's \$50 check was dated February 1, 1985. It was accepted by the Village clerk and was ultimately deposited in the village bank account. All seemed settled until May 25, 1985 when the Building inspector signed a complaint against Ray in the County Court for having erected a dish without obtaining a permit.

Ray hired an attorney who appeared in the case in June and, in July of 1985, filed an answer denying the complaint and further stating that the permit had been applied for, the fee paid, the check cashed, that no notice was ever given of a denial of the application and, therefore, the application is still pending. Ray's counsel argued that the dish installation complied with the ordinance. The village responded that Ray could not assume the permit application was granted and if it had not been approved then it was his duty to go in to court to force the Village to act on it. Unofficially, the Village attorney explained the delay by stating that, at the time Ray applied for his permit, there was a Village "moratorium" on the issuance of satellite permits. The

records of the Village meetings contained no mention of the passage of any resolution requiring or authorizing a moratorium. The Village has not explained why the Chief Judge of the Criminal Division of the Circuit Court of the County was granted a permit for a dish during the "moratorium" while Ray was not. Perhaps some dishes are more equal than others.

The court's final order of October 17, 1985 has been removed from the court file, but it appears that Ray was required to file an engineer's certificate stating that the dish had been inspected and complied with the ordinance. Ray filed an agreement holding the Village harmless from any claims resulting from his use of the dish. He also paid the village an additional \$20. The court apparently did not find any criminal intent on the part of Ray but fined him \$500 for installing the dish without a permit. I doubt that anyone knows for sure where we are headed in the ordinances of the future. That is the way of great civilizations. Only later can we reflect in tranquility and determine how we got into the mess we are in. Hopefully we can learn something from the unusual cases. How can you avoid a situation similar to Ray's? I mean, besides not living next door to Ray.

Perhaps you can go to the Village Hall and get the help of the building department staff in filling out your application. This can go a long way toward avoiding errors and misunderstandings. They are not as helpful as they could be? As an attorney I could advise you to consult your attorney, but you probably wouldn't follow my advice because you're not paying for it. Try a reputable dealer and ask him how many installations he has completed in your town and ask for the names and addresses of a few of them. If he is reputable, he will give references. He may even dial the telephone for you. Make sure he complies with the ordinances before he installs the system. Ask to see the building permit before the installers arrive.

If your town has an overly restrictive ordinance you could do worse than to send a copy of it to SPACE, along with the names and addresses of the Mayor and the City Attorney. If your city is considering an ordinance, SPACE can provide model ordinances and educational material.

All's well that ends well. Ray is still happy that he bought the satellite system. And he still lives in town. ▀





**Patio Cover Or Dish?** - *It not only brings in a clear signal, on a bright day it keeps the sun out of your eyes as well!*

# DISH IN HIDING

## *Is It A Patio Umbrella Or A Satellite Antenna?*

BY PHILIP PATTERSON

In August of 1984, Bobby Slagel sat in the hot Tennessee sun at a satellite TVRO trade show with his antenna and daydreamed. In August of 1985, Slagel returned to the same show and sat in the shade of one of his dreams—a satellite receiver that doubles as a patio umbrella.

The PAT-SAT was introduced at the SPACE/STTI Nashville show and immediately became the hit of the more than 300 antennas on display. Crowds gathered around the antenna which Slagel feels has broken the “beauty barrier” in satellite receivers.

“Size was the first thing that had to be overcome to make these antennas attractive to customers. Once they got smaller, people then wanted them to be more attractive and that’s what the PAT-SAT is all about,” said Slagel, a self-admitted tinkerer and president of Southeast Satellite Systems of Asheville, N.C.

When placed in the center of a picnic table, which the purchaser supplies, the antenna is virtually indistinguishable from an expensive patio umbrella. Eight PVC “ribs” keep the nylon fabric drawn tight over the entire system, leaving no part of the antenna exposed, even during operation, since the fabric is “micro-wave passive.”

The six-foot antenna is made of fiberglass and is the first black fiberglass antenna on the market, Slagel claims. The benefit of the black color is to make the bottom of the dish ap-

pear as a shadow under the umbrella. The nylon covers come in a variety of colors, he added.

The unit comes without a picnic table, but is adaptable to most common varieties. This was done to reduce shipping costs and to allow the consumer to match the furniture portion of the antenna to personal tastes, he said. The wiring for the antenna runs down the center of the umbrella pole.

Slagel is quick to point out that the reception of the system hasn’t suffered at the expense of attractiveness.

“A lot of people think that because PAT-SAT is small, it will only pick up one satellite. That’s not true. In most of the United States, it’s 95 percent effective as a larger antenna. Slagel recommends a high quality LNA (of 60° K or better) and receiver that makes the total system cost just under \$3,000. With the equipment Slagel recommends, the PAT-SAT was displaying a remarkable picture at the Nashville show where it debuted.

Municipalities that have been tough on satellites TVRO equipment as a whole are taking a second look at PAT-SAT.

Max Parsons, a 35-year-old coast guard statistician and resident of Herndon, VA, a Washington, D.C. suburb, moved a PAT-SAT into his backyard despite the community’s ban on all satellite receivers. When the antenna was protested by neighbors, Parsons appealed to the city zoning officials to

observe the PAT-SAT personally before making a decision to ban it.


Following a meeting in Parson’s backyard, and on the advice of the city attorney of Herndon, the city allowed Parsons to keep his antenna. Mac McGillen, owner of Compusat TVRO in Arlington, VA who sold the system to Parsons called the decision “a victory” for the product and the industry.

“The city’s attorney said that it was hard to define an antenna,” McGillen said. “It looks like a table and umbrella, and if he unplugs the antenna, that is exactly what it is and the city had no answer to that.”

PAT-SAT inventor Bobby Slagel is an outspoken maverick in an industry known for mavericks. He claims that as an installer of satellite TVRO systems, he got into the manufacturing end of the business out of necessity.

“We would get a new product and have to work on it before we could ever sell it to our customers. As we became more and more unhappy with inferior products, we looked into the possibility of making products ourselves,” Slagel said.

His first product was an antenna mount. Recently he has developed the Aucuator Weather Guard, a device that retails for under \$100 and keeps the actuator running in sub-freezing weather. He has also invented a device that tests faulty LNAs at the workbench, eliminating the need to move equipment around to test poor reception at the antenna site.

When asked if he was ready to mass produce the PAT-SAT, Slagel replied, “As soon as somebody orders a mass of them.” That time may be coming soon. Since the Nashville debut, PAT-SAT has received exposure in the international editions of *Newsweek* and was the subject of a BBC show in England, said McGillen who has the marketing rights to the antenna. McGillen added that he had been contacted by dealers in several foreign countries about obtaining the rights to PAT-SAT in their country. 

**Beautify Your Antenna** - *This cover by PAT-SAT is virtually indistinguishable from an expensive patio umbrella. The manufacturer indicates that there is almost no signal loss due to the covering.*







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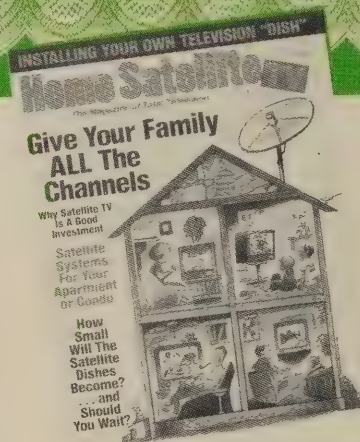
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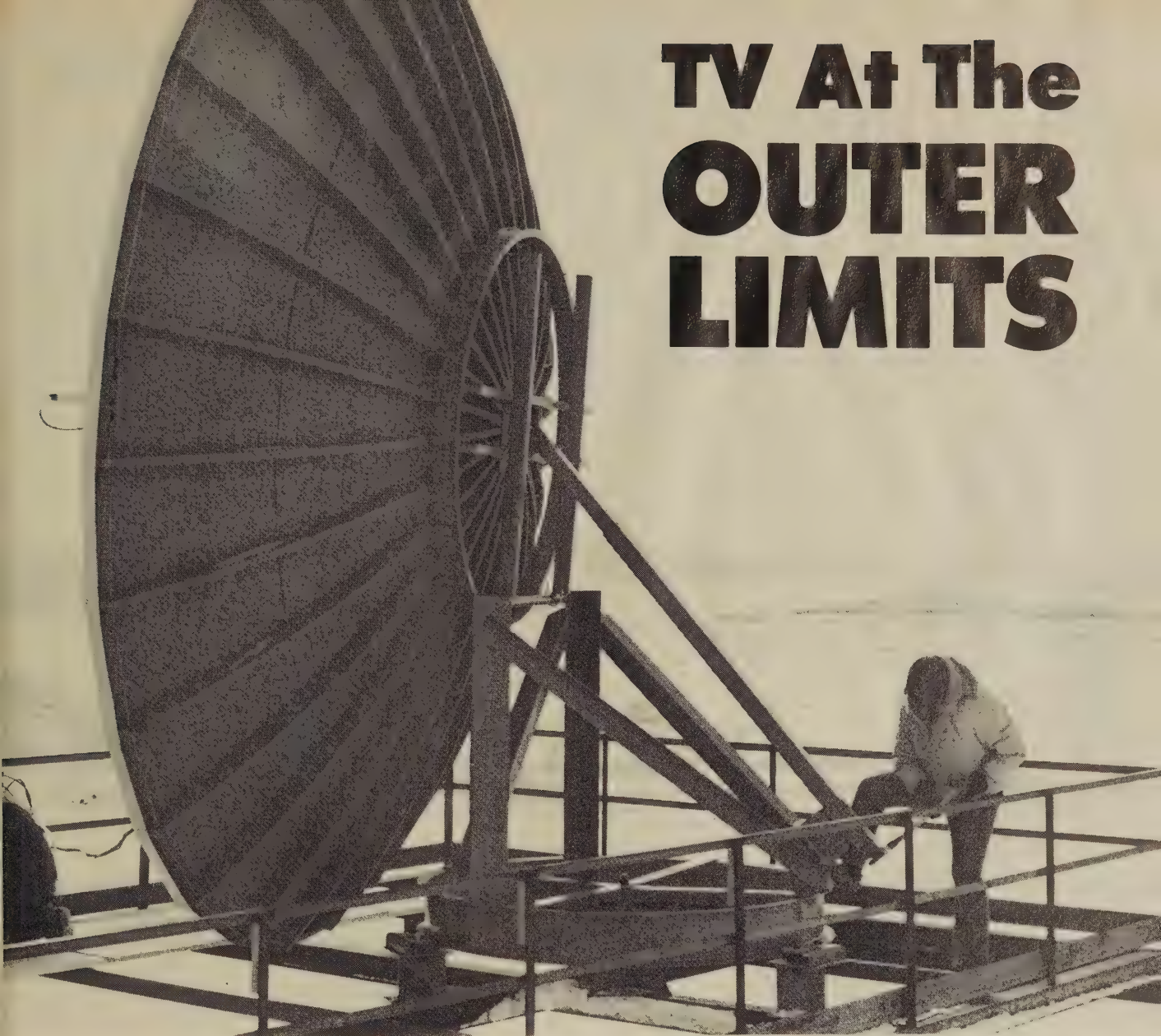
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Home Satellite TV



# TV At The OUTER LIMITS



**TV At The Top Of The World** - Tuning a big dish just 400 meters from the Arctic Ocean!

## *Dishes At The Edge Of North America*

BY JIM VINES

**T**he Canadian "North Slope," 1983. Until a couple of years ago, working at a Canadian or Alaskan oil exploration base camp meant watching old videotapes during after-hours recreation.

The trend along the Arctic North Slope has been to install "private cable" systems or at least to provide satellite TV to one communal viewing room.

Since the new Gulf Oil/BeauDril base camp at Tuktoyaktuk, Northwest Territories represents the state of the art in Arctic drilling and dwelling tech-

nology, the owners decided that it should have "the best private cable system in the U.S./Canadian Arctic Oil Patch."

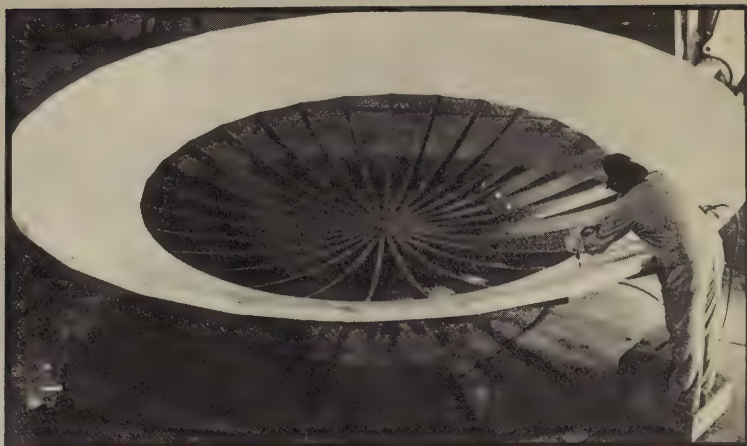
Located on the shore of the Arctic Ocean at 69.5 degrees North 133 degrees west, Tuktoyaktuk is not a place to set your potted palm plant outside!

BeauDril solicited private cable bids from their Calgary office. According to project engineer, Rich Desaulniers, "Although Paraframe's contractors, Cliff Paterson and Greg Johnston (of Geo-Sat Communications, Cochrane, Alberta), did submit the lowest bid, we

based our final decision on their track record as a leading Western Canada TVRO contractor. We also agreed with Cliff and Greg that the Paraframe antenna they selected was the best choice because it could be proofed for surface precision in our presence; and because it had construction features which seemed suited to extreme temperature variations and prolonged use at low 'look angles' which are known to distort some TVRO antennas."

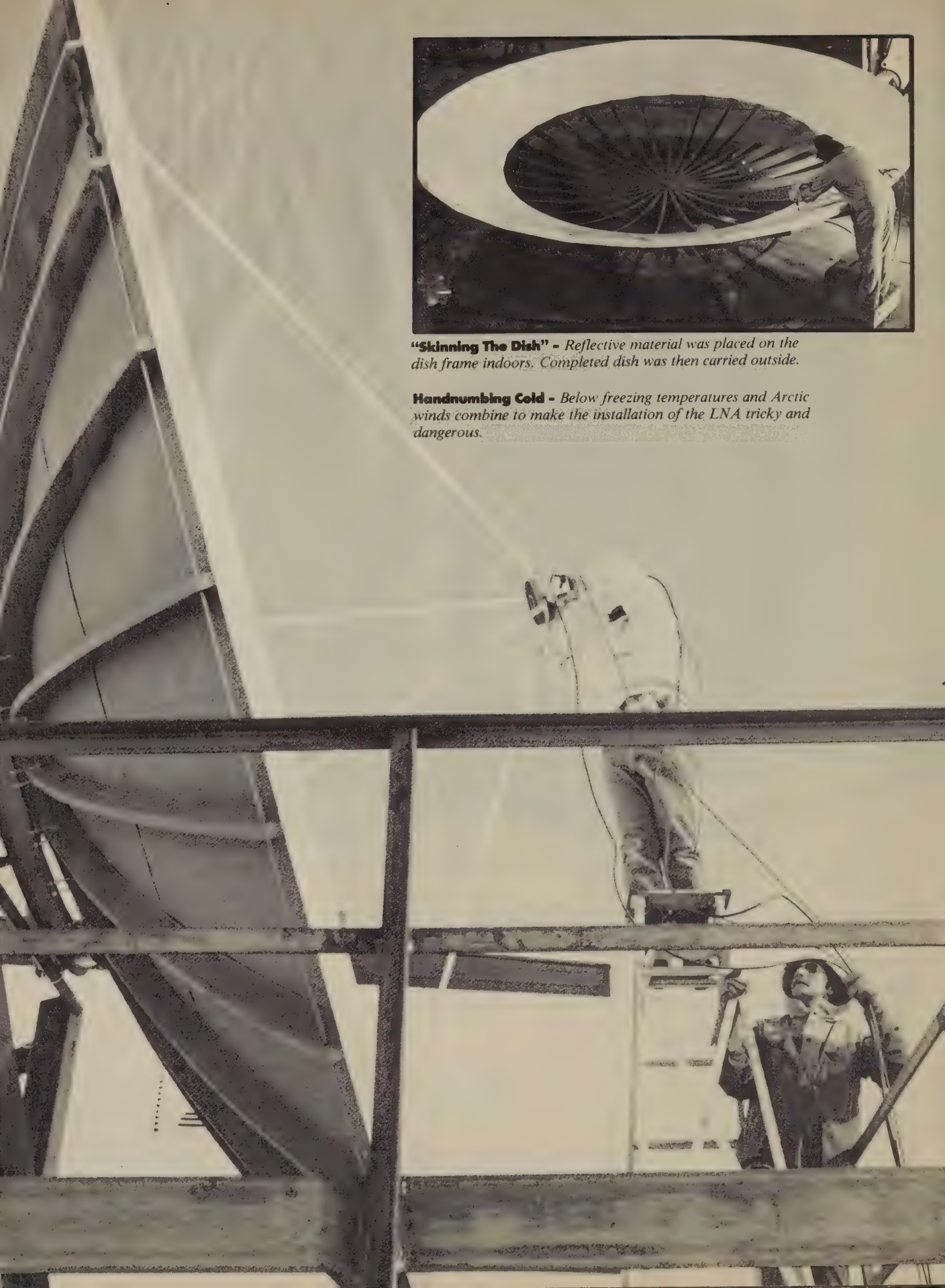
We received the hard order at our office in Edmonton in early March; and three weeks later shipped the antenna





**"Skinning The Dish"** - Reflective material was placed on the dish frame indoors. Completed dish was then carried outside.

**Handnumbing Cold** - Below freezing temperatures and Arctic winds combine to make the installation of the LNA tricky and dangerous.





# Outer Limits

Continued from page 59

parts northward via Yukon Freight Lines. The route taken would traverse the bush country of Northern Alberta and the Northwest Territories, ending its 1,500 mile journey over the "winter route" of the Dempster Highway. The "winter route," we would discover upon our arrival (we would fly two weeks later), includes 30 miles across Arctic ice!

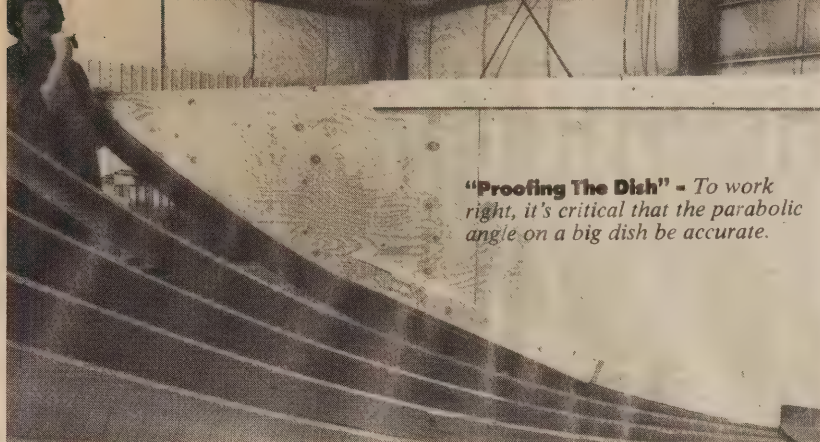
On April 4th, I joined Geo-Sat's Cliff Paterson and Greg Johnston as well as Gulf/BeauDril's Rich Desaulniers at sunrise at Edmonton International Airport for the PWA "milk run" to the High Arctic via Yellowknife, Norman Wells and Inuvik.

After a whistle stop in Yellowknife, our Arctic odyssey was underway. From 35,000 feet we could see the mighty MacKenzie River stretching and winding northward. (Seeing a major river flowing *north* is still unnerving for someone from Hoopeston, Illinois!)

As we descended toward Norman Wells, an outpost of 389 souls on the great river's shore, the MacKenzie Mountains—80 miles distant—appeared to "float" on top of a lake. The "lake" was actually a temperature inversion, caused by heat rising as the feeble early spring sun warmed the 80 miles of almost pitch-black forest that spread out across the "flats" from the river to the mountains. If an early morning temperature inversion causes the eye to see things in the wrong place, what would it do to the simple radar "eyes" of a Cruise missile as it flew in low over the Russian landscape—smack into the first hill? Hopefully, while the Pentagon pours our tax dollars down a yawning black hole maybe they'll find an answer to the "cruise" question.

From Yellowknife to Inuvik—a distance of about 800 miles—one flies over about four settlements the size of Norman Wells. From an altitude of 35,000 feet (or just 35 feet) there is no evidence of human habitation along the way. Well, there is one piece of evidence that Man *has* been there: everywhere there are surveyors' "cut lines"—"cutting" through the endless miles of forest. One thing, they know where all their mineral resources are!

One can see evidence of prevailing wind action because the seemingly endless lakes are oriented in the same direction. The bedrock lies close to the surface, baring itself in stark and rugged majesty here and there; and you



**"Proofing The Dish"** - To work right, it's critical that the parabolic angle on a big dish be accurate.

have to wonder how those 100-foot jackpines manage to develop roots in the thin topsoil.

The takeoff from Norman Wells was dramatic: Our Boeing 737 bolted up off the short runway on a southward heading, then banked very sharply to the east, where we cleared a single range of mountains identified on any good map as the Franklin Range.

The Franklins are one of those geological oddities that often are found paralleling the Rockies to the south, as well as the MacKenzies and the Richardsons to the north. Situated a good 80 to 100 miles east of the MacKenzies, the Franklin Range is a 300-mile long "strike" that juts 2,000 feet above the surrounding forests.

As we cleared the Franklins we spotted a microwave tower with a couple of "repeater" dishes. What an installation job *that* must've been, I thought, picturing everything being flown in by helicopter.

Shortly afterward I found myself up in front, sitting in the navigator's chair, behind the pilot and copilot; a big difference between the Arctic milk runs and flying to more mundane places like Winnipeg or Walla Walla.

Approaching Inuvik one is confronted with an awesome sight: the "tree line." This is the northern terminus of tree cover which stretches all the across North America. And at Inuvik the tree line stretches further north than anywhere else on the continent.

Beyond, ground and sky were white and merged together.

During an hour's wait at Inuvik Airport we donned Arctic survival gear, then boarded a Ken Borek Airlines "Twin Otter" with seating for 19. At 500 feet above ground one could see the panorama of Inuvik and less than a mile north of it the fabled tree line, abrupt and final. Beyond that only a few straggling stunted pines were in evidence, and only on the southern exposures of small hills and gullies. Very

soon the tree line would be a thin black line on the southern horizon.

Sixteen oilfield workers and three TVRO engineers seemingly enveloped in a blue-white world! The Earth below was veiled in a white haze. The haze, we were warned, was the worst white-out of the long winter. Sixty miles to the north was Tuktoyaktuk.

It took our pilot three "white knuckle" passes at the "Tuk" landing strip to make it down, with the plane yawing sideways all the way down to the ground. The airport's wind sock stuck out straight, warning us of the announced 50 MPH wind that would blast us as we deplaned into an outdoor windchill factor of -100° F!

The Gulf Oil/BeauDril basecamp could be compared to an Arthur C. Clarke description of a space colony of the future. While outside the air (without the wind chill) ran between -6° and -22° F during our stay, it was quiet and warm inside.

The days were already 15 hours long, just two weeks into "spring," but sodium vapor lights atop 50-foot poles illuminated the "yard" continually lest anyone became lost during a whiteout. To prevent the buildings from heating up the permafrost, their concrete floors are suspended five feet above the ground by timber pylons. Without this design trick, the permafrost would melt and the entire colony would sink into the quagmire!

The whiteout that greeted us lasted for three more days. During this time we assembled and proofed the 6 meter (almost 20 feet!) dish, racked the five (that's right—5!) receivers, and ran 9,000 feet of cable to the 90-plus wall outlets designated for "private cable" service.

On April 7, the wind died down enough for the antenna to be hauled outside. (Unlike at Resolute Bay a year later we assembled this one *inside*!) The antenna was then installed on its

Continued on page 62



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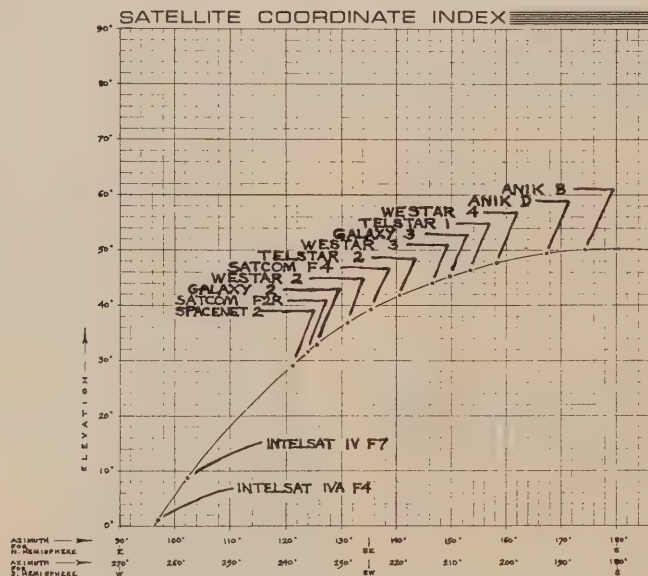
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## Outer Limits

Continued from page 61

own special pylon platform beside the combination administration/dormitory building.

Try to imagine hunting for satellites in -10° F cold, with 15 MPH winds, and a 5-inch Sony color monitor sheltered in a cardboard box—and a 2,000-pound antenna to turn!

With the special "azimuth-elevation" mount which I incorporated long ago as a standard feature, one man (this writer) could first "tilt" the 1,250-pound dish to Satcom's F3R's predicted "look angle" of 12 degrees (per Finindex plot for "Tuk"). Next this very average-size writer turned the 2,000 combined moving mass of dish and mount to the predicted azimuth (direction).

Huddling over the Sony-in-the-box, Greg Johnston shouted "you've got it, you've got it!" I'd heard those words in places like Nassau (Sam Jackson) and in Tegucigalpa, Honduras (Father Valentine), and now in Tuktoyaktuk. I could hear it in my imagination—Lowell Thomas, chiming over the airwaves: "From Tuktoyaktuk to Tegucigalpa..."

With noses running we stood there, all swaddled up in thirty-four layers of clothes watching a 5" color TV that sat in a cardboard box. In the now-windless silence of an Arctic sunset, the words of the TV announcer pierced the air. We had come to the furthest reaches of North America to listen (and watch) an Empire Carpet commercial which originated from the Chicago Super Station, WGN....

The rest was anticlimactic. We hit other satellites like Westar 3 and 5, Satcom F4, Aniks B and D. No Galaxy One yet—it wouldn't go on the air til mid-August.

On our last full day we were treated to a full tour of Tuktoyaktuk. We saw the U.S. "DEW Line" antennas peering out over endless Arctic ice. We visited the local Hudson's Bay store to buy "Tuk U" T-shirts. (My favorite? "Tuktoyaktuk—Not the end of the Earth, but you can see it from here!") Then we drove a couple of miles out of town onto the Arctic Ocean via the Dempster Highway winter route where the previous December a "pressure ridge" had explosively erupted underneath a thundering Yukon Freightlines Eighteen-wheeler, separating truck from trailer.

"Out here life's a game of chance," remarked our host.

"Not the way we play it," retorted Geo-Sat's Cliff Paterson. ↗



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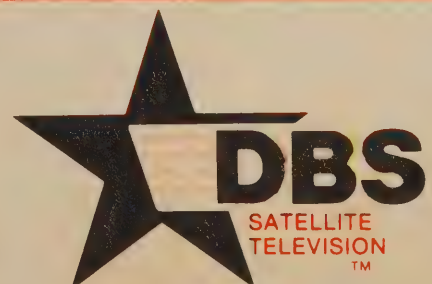
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MARCH, 1986







# SATELLITE SPORTS BAR

## *It Pulls In All The Major Events For The Fans Of Central Oregon*

BY DAVE SHELDON

It's a wintery Sunday morning in Bend, Oregon, and the recreation possibilities are abundant: The powdery slopes of nearby Mt. Bachelor beckon to alpine and cross-country skiers. If you're a hunter, a major flyway for Canada geese is just a short drive south. For snowmobilers, the Cascades are a vast playground. But if you're a football fan, you're looking at an eight-hour drive to see the Seahawks in Seattle or a three-hour flight to attend a Forty-Niners game.

That is unless you're a patron of the Deschutes Station (pronounced des-shoots) restaurant/tavern on the south end of this Central Oregon community. At the Station, today's football menu includes eight NFL contests, five of which can be viewed simultaneously. On any NFL Sunday, Deschutes Station is showing live TV coverage of the most important games in both the NFC and the AFC, plus gridiron battles featuring local favorites or any other game that a customer requests.

All this is possible because Deschutes Station is equipped with not one, but two satellite dishes capable of receiving both C-Band and Ku-Band broadcasts. Add the locally broadcast network, plus cable TV coverage, and you begin to get the picture. Wrapped up in the decor of an Old West stage stop is one of the highest of the high-tech earth stations in Oregon, Deschutes Station.

Superb sports coverage isn't the only drawing card, though. In fact, Deschutes Station is a family restaurant that specializes in entertaining youngsters as well as football fanatics. "We used to do a lot of promotions," reminisces co-owner, Gary Olson. "But that got to be too much. Now we have something for the entire family."

Once known for loud local bands and live amateur boxing, Deschutes Station has recently taken on an atmosphere of family fun. Besides TV coverage of just about any sporting event imaginable, this restaurant is big enough to house a basketball hoop and a giant slide for the kids, as well as the latest video games for the young at heart.

Birthday parties are a big item, too. "We have four or five parties on some Saturdays," notes Kathy Olson, between inflating party balloons and serving hamburgers. Gary, dressed in a yellow chicken suit, leads the kids in se-

veral rounds of "Happy Birthday" while their parents enjoy satellite TV sports.

When their first dish was installed in the fall of '81, the Olsons were real satellite TV pioneers. They had to purchase the system from a company in Eugene, 150 miles west of Bend, because, as Olson recalls, "I couldn't find anyone around here to sell us one who knew any more (about satellite TV) than I did."

Their second system, installed in August of '85 by Olson, employee Mike Bowe, and local radio announcer, Mike Camurka, is equipped with dual feedhorns for reception of 4GHz and 12 GHz programs. The 12 GHz programming is limited as yet, but it definitely fills out the football menu. Pioneers once again, the Olsons' is the first 12 GHz satellite system in Central Oregon.

"Ku-Band reception is much more difficult," notes Bowe. "If you barely bump the dish (with the actuator), you've lost the picture." This explains the heavy-duty 52" long actuators that provide extra support for both dishes. Standing alongside U.S. Highway 97, these dishes must withstand the wind kicked up by a thousand tractor-trailer rigs each day; enough to blow any earth station off track.

The abundant local snow can also be a problem. "The snow isn't too bad with C-Band," says Bowe. "But I had to sweep it out of that Ku dish three times during a game last week to get a good picture." A word to the wise for 12 GHz enthusiasts in northern latitudes.

Of course, football isn't the only satellite sport for local fans. Baseball, basketball, hockey, skiing, and boxing are also popular. Except for professional boxing matches, however, Deschutes Station does not promote specific events. Olson prefers to let his customers select the programs to be shown. And they choose virtually 100% sports. "I can't remember the last time someone wanted to see a movie," he remarks. "I don't think I could measure what effect the satellite TV has for business. I know I enjoy it, because it gives me something to do. It's fun to help a local fan who doesn't have his own system."

Even the prize fights are promoted mostly by word-of-mouth. A core of avid fight fans has supported each of the closed-circuit main events shown at the Station. Authorized through Top Rank Promotions, the matches are descrambled with the addressable Oak Orion Decoder. Olson receives two of the units several days before an event, which are usually authorized only for the duration of the bout.

The local fans enjoy the atmosphere of the Station, preferring not to make the long drive to Portland or Eugene to view a fight in an auditorium. Even though the boxing matches just break even for Olson, he plans to continue downlinking those which are available through Top Rank.

*Continued on page 66*

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**On Any Sunday** - At Deschutes Station in Bend, Oregon, you can watch a half dozen or more football games, up to five of them simultaneously brought in by two dishes. Basketball and baseball rule during their seasons and hockey, skiing and boxing are also popular.



## Sports Bar Continued from page 65

It provides a service to the local community, and as Olson says, "It's fun to work when everyone else is having a good time." He also notes with well-deserved pride, "Deschutes Station was the only place in Oregon to show the Hearn-Duran (WBC Super Welterweight Championship) fight."

Basketball is actually the most closely followed professional sport in the area, due largely to the popularity of the Portland Trailblazers. Last year, when the team made the NBA Playoffs, the local sports fans crowded into the Station with a good case of "Blazermania". Oregonians love the Trailblazers, and with many games not televised locally, and virtually every home game in Portland's Memorial Colosseum sold out to the rafters, offering the live telecasts on giant screen TV is very popular with the locals. In an interesting twist of mixed media, the Station features the satellite video, while tuning to a local radio station for the audio. This allows viewers to enjoy the superb play-by-play commentary of radio announcer Bill Schonely while watching the game via satellite.

College football and basketball, and other amateur sports are covered as completely as are the professional events. "Basically, we like to show what people want to see," says Olson. "If someone calls up and wants to watch a hockey game, if we can find it, we'll put it up there."

Several programming guides provide the Deschutes Station's staff with the latest information on sports telecasts. If it's on satellite they can usually find it. In fact, Deschutes Station has gained something of a reputation among local dish owners for being the foremost authority on the

whereabouts of upcoming sports feeds. Before a big event, the telephone is often tied up for hours with dish owners calling to find out which satellite is broadcasting the event.

"In the early days," Olson recalls, "We didn't know which satellite we were watching. We just scanned until we found something. Now the equipment is much better." And speaking of equipment, here's a rundown on the gear that makes up Deschutes Station's two-dish system:


### C-BAND SYSTEM

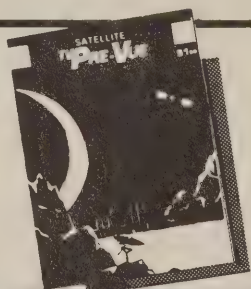
11" Fiberglass Dish  
w/ Polar Mount  
100° K LNA (C-Band)  
Chaparral Polarrotor I  
Automation Techniques  
GLR-560 Receiver  
Automation Techniques  
Downconverter

### DUAL-BAND SYSTEM

8' Spun Aluminum Dish  
w/ Polar Mount  
85° K LNA (C-Band)  
Chaparral Polarrotor I  
DX 12 GHz LNA and  
Feedhorn (Ku-Band)  
DX DSA 600 Receiver  
(Dual-Band)

Houston Tracker 52" Actuator    Houston Tracker 52" Actuator

Add to this a Drake VS-35 Video Selector, 4 19" color TVs, three VCRs, and a giant screen Projection TV, and you're getting close to a fully-equipped earth station. It may not be quite as big as the four-dish system at Ricky's Lounge in Oakland, or as high-tech as the computerized "sports environment" of the Vallemar Station Sports Bar across the bay in Pacifica, California; but for Central Oregonians, the Deschutes Station will do just fine. On your next ski vacation or fishing trip to the high Cascades, remember, your favorite team is only an earth station away. . . Deschutes Station that is! 



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# A GIANT TUNES IN

## *AMWAY Begins Marketing Home Satellite Systems*

**Entering The Home Satellite Market - Amway's world headquarters at Ada, Michigan**




**H**ome TV viewing via satellite is penetrating the establishment of America. Major manufacturers such as Kenwood and Panasonic are entering the field with home receiver systems. Major distributors such as Tandy/Radio Shack have announced plans to sell systems. And now, AMWAY, one of the world's largest direct sales firms (over a billion dollars in sales annually) is bringing satellite receiver systems directly into the home.

A "home" satellite system is an ideal product for AMWAY, reports company representatives who point out that AMWAY's entire operation is geared to selling via independent distributors who call directly on consumers.

The system, called an ASR 500 and utilizing a six-foot Weingard dish, is listed at \$999.99 in the current AMWAY Personal Shoppers Catalog (where it is prominently displayed on the back cover.) The catalog states, "Now you can tune into the world and bring it right into your own home environment . . . You'll be able to enjoy over 100 news and entertainment channels, pulled in from 15 satellites, 24 hours a day." (AMWAY officials acknowledge, however, that with a 6-foot dish the primary target is the powerful Galaxy I satellite.)

Each perforated aluminum dish comes with all equipment needed for viewing including all hardware for installation (except anchoring devices), 100 feet of cable and a receiver. The receiver uses block down conversion.

AMWAY's entrance into the field should be taken as a signal that home satellite receivers are gaining full acceptance by the public. This is even more clearly evidenced when an AMWAY official reported that sales of the new system are running "10 times higher than we anticipated!"

If they are being sold in the home by AMWAY, then they're soon to be about as American as grandma's apple pie. 

### **Bringing Satellite TV To the Home**

*Amway distributor offers satellite system directly in customers' living rooms*





# SURROUND

BY TIM HARRINGTON

*This is the first of a series of articles that will focus on the concept of designing and integrating a satellite TV system into a complete home entertainment system. These articles will cover a variety of topics such as:*

- *Designing a home entertainment system from the ground up*
- *Connecting your satellite TV system to your stereo*
- *Setting up a true theatre Dolby Surround Sound system*
- *Cabling your home for video and sound wherever you want using modern cable company techniques*
- *Remote control of your home entertainment system from anywhere in your home*
- *Switching and dividing units to control your home antenna*

*This particular article will introduce you to the concept of a true Surround Sound system for your home that will rival or exceed the experience of a Surround Sound system in a movie theatre.*

If you think Surround Sound is just another quadraphonic system then read on. Satellite TV offers a whole new dimension in the quality and variety of video programming. But, if you haven't experienced satellite TV sound through a good quality stereo HiFi system, then you are missing half of the incredible entertainment experience that satellite TV has to offer.

Before we get into the details of Surround Sound, let's first explore the concept of a complete home entertainment system. My definition of a home entertainment system is the complete integration of all programming sources of video and audio into a complete unit that has its main components (or most of the key components) centrally located and interconnected in such a way that video and audio programming can be fed to any part of the home that is desired. The concept is modular in that it is designed in such a way that it can grow and improve as technology develops and improves. This series of articles will also be modular in

that each one will stand alone as a subject but will be oriented as a "piece" or building block of the complete home entertainment system.

If you plan to put together a home entertainment system, a satellite TV system is an excellent place to begin because of the exceptional quality of video and audio that it is capable of delivering. For example, if you decide to add a theatre type Surround Sound system, you will find that a number of satellite TV movies are already broadcast in Dolby Surround Sound.

## Is A Videophile Also An Audiophile?

If an audiophile desires the best quality audio reproduction possible, given a certain budget, then you might assume that a videophile must be in quest of the best quality video. While that is probably true, I contend that part of the total enjoyment of video programming is good quality audio. Therefore many of today's and tomorrow's videophiles will probably become audiophiles if they are not already. One reason a movie theatre experience is more dramatic and enjoyable than TV at home has as much to do with the quality of the sound as it does the size of the screen.

The technological developments of home video entertainment systems have in many ways paralleled, with a few year's delay, the same steps of advancement as the movie theatre. In the early days of motion pictures when sound was first added to a moving picture, most people really didn't pay too much attention to the quality of the sound. Just having a moving picture with a sound track was amazing. Then slowly but surely the quality of movie sound improved through both advances in recording during the production of the movie and advances in playback systems at the theatre. Later stereo was introduced and now there is Surround Sound. Following this history, stereo sound in video home entertainment centers will become more prevalent and eventually many people will upgrade their systems to Surround Sound. For those of you who think Surround Sound may suffer the same fate of rapid extinction that quadraphonic sound did, I will tell you later why this is very unlikely to happen. First let's talk about what Surround sound really is.

*Continued on page 70*



# SOUND

*Satellite Reception Means  
That You Can Have The  
Ultimate In Sight And Sound*



**Sound Processor** - The Audionics SD-2 features both Dolby Surround as well as a time delay to match your room's size.

**Surround Sound** - more than just two stereo channels.

Larry Reagan of Hillcrest HiFi in Dallas, Texas demonstrates how audio processing can fill a living room with sound.



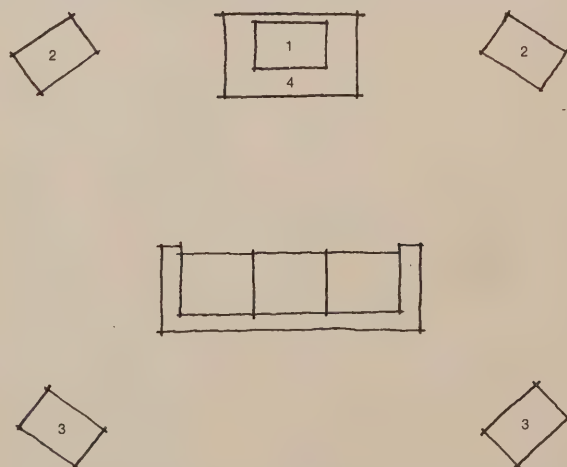


There is a lot of confusion on this topic as a result of misinformation coming from both well intentioned, but misinformed, stereo salespeople and the know-it-all Uncle Harry types. Before defining Surround Sound, other than to say it is a multiple channel reproduction of a recording that adds an amazing sense of depth and dimension to sound, it would be helpful to present a very brief review of some basic HiFi terminology so that we will begin our discussion from a point of common ground of understanding. If you are an experienced stereo buff, please skip ahead a few paragraphs.

Sometimes there is confusion over the terms stereo and HiFi. HiFi or high fidelity is a term that came out in the fifties meaning high quality faithful reproduction of the original sound. When two channel recording of sound was introduced to the public it was called stereo or HiFi stereo. These days the terms stereo has pretty much come to mean high fidelity. I can now go to a drug store or a super grocery store and buy a "stereo" but does this mean that I will get good quality sound? Not necessarily. The best example of this is VCRs (video cassette recorders). Until recently, VCRs had relatively poor quality audio. Then stereos VCRs were introduced which gave them two channels of relatively poor quality sound. I bought a stereo VCR that incorporated a Dolby noise reduction circuit which did reduce the tape hiss so that I now I had poor quality stereo sound with low tape noise. It was not until HiFi stereo VCRs were introduced that we could experience HiFi or good quality audio on VCRs.

Interestingly enough, HiFi VCRs made the leap from poor quality sound to sound that exceeds reel to reel tape recorders.

The point here is simple but very important. You can have stereo sound that is not necessarily good quality and the Dolby name on something does not mean that the sound will be great. (No fault of Dolby Laboratories if their process is included in a low end stereo unit!)



Just one of the many variations of speaker arrangements possible for a Home Surround Sound System.

- Speaker No. 1 - Voice or Dialog Channel.
- Speaker No. 2 - Left and Right Regular Stereo Channels.
- Speaker No. 3 - Surround Sound Channel.
- Speaker No. 4 - Optional Subwoofer.

## So What Is Surround Sound?

Surround Sound is a multiple channel system with either three or four channels, depending on the brand of the Surround sound equipment and speaker layout. What this does is provide a striking feeling of depth and spaciousness to the overall sound. Special movie effects are enhanced by adding depth and dimension to the sound in such a way that cause space craft to seem to fly right over your head. It is rather difficult to express the experience, and therefore should be experienced.

When decoded by professional Dolby processing equipment, left, right, center, front and Surround information is

***Special movie effects are enhanced by adding depth and dimension to the sound in such a way that cause space craft to seem to fly right over your head. It is rather difficult to express the experience, and therefore should be experienced.***

recovered from the original left and right channels. The dialog or voice channel is usually encoded in such a way so as to cause it to be played back through the front center speaker. This ensures that a viewer seated along the walls of the theatre (or living room) will still perceive a correct stereo image.

In the motion picture industry this is known as providing a "hard center front." This could not be accomplished by the use of only left and right channel speakers because the viewer seated at the extremes of the theatre would perceive a skewed stereo image. The Surround Sound channel sound is distributed by an array or group of speakers around the sides and rear of the theatre. The Surround Sound channel provides sound effects and ambient sound. The sound level from the Surround Sound channel is usually lower than the main channels but it is of major importance in creating the spaciousness and sound impact in a theatre.

Surround Sound is often referred to as the "theatre experience" for a very simple reason, it began in and was designed for movie theatres and, until recently, a movie theatre was the only place in which one could experience Surround Sound. The so-called movie theatre Surround Sound experience includes a large screen for visual impact, a three channel front stereo sound system, subwoofers, a Surround channel fed through a time delay system, and usually a relatively 'dead' acoustical environment. (Dead meaning relatively free from reflections and reverberations that reduce the quality of the sound.) Your impression of Surround Sound in theatres, if you have ever experienced it, could range anywhere from powerfully impressive to a bad experience. There are many aspects of a theatre that can reduce or ruin the Surround Sound experience such as an insufficient sound system with poor frequency response, inadequate amplification and speakers, and poorly placed Surround Sound speakers. While there are many theatres that advertise that they offer motion pictures in Dolby Surround Sound, many do not do a very good job of it. It is important that you hear a Dolby Surround Sound system that is properly set up before you write it off.

There is also a slight time delay between the sound from



the front speakers and the sound from the Surround Sound channel. There are two important reasons why time delay is necessary for use on the ground sound channel, both in the home and in a motion picture theatre. In the theatre, the distance from the front speakers to the viewer may be one hundred feet or more. The amount of time required for the sound to travel to a viewer in the rear of an auditorium may be 100 milliseconds or more. Without time delay, the viewer would hear the sound from the closer Surround Sound speakers before the accompanying sound from the main front speakers. In addition, time delay is used to take advantage of the precedence or "Haas" effect. The "Haas" effect is applied with the use of time delay. The human ear and brain will ignore crosstalk from the main front channels to the surround sound channel if the sound is delayed 15 to 30 milliseconds. This time delay feature found on the Audionics unit can be varied to match the size of the room that it will be used in.

The question that you may want answered at this point is do you need a specially encoded or recorded programming? The answer is a definite yes and no. Equipment employing Dolby circuits such as the Audionics unit, was designed to decode or process Dolby Surround Sound encoded programming material and more and more movies have their sound tracks encoded in Dolby Surround Sound. However, the methods used by many recording studios record the sound in such a way that, although it is Dolby Surround Sound encoded, it is still enhanced when played back through a Surround Sound played through a Surround Sound system. This is especially true for video presentations where the voice should appear to come from center where the picture is. The fact that Dolby Surround sound is well established in movie theatres and a standard production recording technique for more and more movies will likely ensure its continued survival for years to come.

Surround Sound is *not* a rebirth of the quadraphonic or quad system that was introduced during the sixties as the

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***Surround Sound is not a rebirth of the quadraphonic or quad system that was introduced during the sixties as the next major advancement for the audiophile. Quad died a painful death.***

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next major advancement for the audiophile. Quad died a painful death. Painful that is, for those who bought them. It's not that Quad was bad, but because it never caught on, people who had invested in quad were stuck with a limited selection of programming to play on it. We'll leave all the reasons for the demise of quad to the historians. There is very little parallel between the history of quad and Surround Sound.

The following is just a few of the Hundreds of motion pictures that have been processed in Dolby Stereo and are available via satellite or on Beta HiFi, VHS HiFi, and Laser Videodisc formats: Alien, Blue Thunder, The Empire Strikes Back, 48 Hours, Gandhi, Star Wars, Star Trek I, II, III, Raiders of the Lost Ark, The Right Stuff, Flash Dance, Romancing the Stone, Saturday Night Fever.

I made random calls to a number of stereo retailers and found that very few knew much about Surround Sound

and hardly any knew how to set up a Surround Sound system. So if you become interested in investigating further in your home town, I advise you call before visiting an audio retailer or satellite dealer to make sure that they even know what Surround Sound is.

The next article on Surround Sound will take up where this one leaves off and will cover the design and set-up of a home Surround Sound system. I have not discussed price so far because it can vary dramatically depending on how extravagant you want your Surround Sound system to be. The Audionics unit carries a suggested retail of \$395.00 and to that you would add an additional stereo amplifier of at least 20 watts and two or more additional speakers. Fortunately the additional speakers do not have to be exceptional quality since the additional Surround Sound channels carry audio information that "fills in" information to your brain to create a much fuller sound experience. The sound from the Surround Sound channel ranges from approximately 100 hz to 6000 hz which means that a good quality midrange speakers will suffice for the Surround Sound channels. A subwoofer can be added to this arrangement if you would like the deep rumbling of explosions and other effects that add so much to the "theatre experience."

This article just begins to touch on the potential quality of entertainment offered by a complete home entertainment system. As you learn about additions to your system, remember, if designed properly a home entertainment system can be expanded almost without limit, so don't worry about what equipment you don't have now because by its very nature, your home entertainment system will be expandable and therefore never complete. So enjoy what you have and start planning for the future! ♣

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*The next article in this series will delve deeper into the concept of Surround Sound along with a discussion of how to set up a Surround Sound system in your home including equipment needed, how to wire it up and details on proper speaker placement.*

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## **TECHNICAL CORNER**

*Some of the features of the Audionics SD-2 Dolby Stereo Processor as described by the Audionics people are as follows:*

**Automatic Input Balancing:** *Adjusts the critical internal circuitry necessary to achieve optimum decoding of the encoded surround sound effects automatically. Stereo input signals are automatically balanced with input errors as high as 6 db. This is critical in order to obtain optimum spatial effects.*

**Adjustable Time Delay:** *Provides time delay on the surround sound channel output from five to thirty milliseconds which enhances the Surround channel sound effects.*

**Dolby B-type Noise Reduction** *on the Surround Sound channel reduces noise from the sound track and time delay circuit.*

*"Dolby," "Dolby Stereo" and Dolby Surround" are registered trademarks of Dolby Laboratories Licensing Corporation.*

This article is an excerpt from a new book soon to be released called *Understanding Satellite TV* by Tim Harrington. ♣





## The Jockey's Private Earth Station

**R**ay Sibille isn't able to take his work home with him. Sibille is a jockey, and thoroughbreds don't exactly fit into a briefcase.

But while at home he is able to watch other jockeys at work, thanks mainly to the satellite dish he had installed in his spacious back yard three years ago at his beautiful home in Arcadia, Calif.

While most other jockeys in Southern California get only the nightly reruns from Santa Anita or Hollywood Park on commercial television, Sibille also gets to see racing from the Meadowlands in New Jersey and the Laurel and Pimlico race tracks in the Baltimore area. Occasionally, he picks up races from other tracks as well.

Does the additional study time give Sibille an edge? Sibille says no, but if watching a lot of horse racing on television isn't helping, it sure isn't hurting.

Sibille, 33, is one of the better jockeys in the business. He won purses totalling \$3½ million in 1984 with 128 winners, 133 seconds and 134 thirds in

1,240 races. His numbers for 1985 were equally impressive.

Sibille says he bought the dish for sports. "Mainly, LSU football and basketball," he said. "I saw about half of LSU's football games last season."

Sibille is from Louisiana. He was born in Church Point and raised in Sunset (pop., 4,000), near Lafayette.

Sibille bought his dish from a friend, Jim Buckley, a horse owner who also owns Santa Anita Video in Arcadia. It's a 12-footer that cost \$4,000 in 1982.

"It's fantastic," said Sibille, who gets a lot of use out of it.

First of all, there's all the sports.

Secondly, he and his wife Dot and 12-year-old son Keary can watch prime-time programming three hours earlier than scheduled because they live on the West Coast. That's a real advantage, since Sibille has to be at work by 7 a.m. Wednesday through Sunday.

The Sibilles enjoy staying home and watching television. It's not that they're anti-social, it's just that Ray usually feels a little more comfortable at home. He's not one for going out and making small talk with people.

He'd like to, but it's difficult.

Sibille has a severe stuttering disorder. Always has and probably always will.

Sibille makes no attempt to hide it. It's evident when he talks. He may get out one or two thoughts smoothly, then struggle with the next one or two.

"I can't really remember when it started," he said. "I guess it's been with me all the time, for as long as I can remember. When I was younger, I went to all kinds of schools to try to help it. I don't know when or why I started, but we tried everything to end it."

Handling a strong thoroughbred that weighs up to 1,500 pounds is much easier for Sibille than speaking, which

seems so simple to most people.

He discovered at a young age what he could do well. He was racing horses at age 8, and began doing it competitively at Evageline Downs in Louisiana in 1969 at age 14. By age 16, he was riding at Louisiana's top track, the Fair Grounds.

In 1973, at the age of 18, Sibille decided to try his luck in Chicago. He established himself quickly and won more than 100 races a year for eight years. For four straight years, 1978 through 1981, Sibille was the leading rider at Chicago's Sportsman Park.

Like many jockeys in the Midwest and East, Sibille had heard about California racing: ideal weather, quality horses, top trainers. So, in 1981, he came out for the Orange County Fall Fair at Los Alamitos with trainer Richard Hazelton, and was the leading rider.

"I planned to stay only a month and a half," Sibille said. "But I ended up staying for good. Almost every rider wants to at least try to make it in California."

In 1982, Sibille became a regular on the California circuit. He won the Oak Tree Yellow Ribbon Stakes at Santa Anita aboard Castilla, the Hollywood Park Honeymoon Handicap aboard Castilla and both divisions of the Hollywood Park Matriarch aboard Castilla and Pale Purple. It was a good year — also the year he bought his satellite dish.

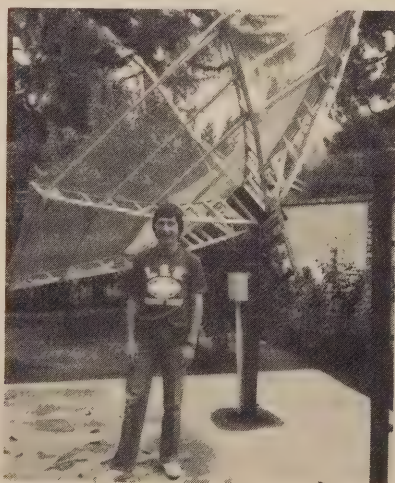
In 1983, Sibille won the Silver Bells Handicap at Hollywood Park aboard Sweet Diane. And the sweet times have continued.

But there's always the speech problem.

As a child, he spent much of his time in special classes. Nothing helped. "My mamma ran all over the country trying to find something to control it," he said.

Sibille's mother, Emerite, told Sam McManis of the Los Angeles Times that Ray became ill when he was very young and began stuttering shortly after he left the hospital.

"I remember that he ate something that made him real sick," she said. "They put Ray in a special oxygen tent and that's when I recall it first develop-



**Tuning Into The Races** - When Ray Sibille isn't jockeying, he's tuning into the results from Pimlico, Laurel and the Meadowlands on his satellite TV system.





**Satellite Jockey** - Ray Sibille rides Castilla, winner of Matriarch and Del Mar Oaks.

ing. But I think it's more nerves than anything else. He just goes ahead of himself."

Obviously, that's an oversimplification of a disorder that affects, to some degree, an estimated 1% of the U.S. population. In a story that appeared in the Times in April of 1983, McManis reported that a spokesman at the USC speech clinic said there are many theories about stuttering and many therapies. Some say it's psychological—trauma related—while others think it is a physical disability.

All Sibille knows is that he's stuttered all his life.

Because he grew up in a small town and most people knew of his condition, Sibille said he had no real problems.

"When I was a kid, I went to the same schools with the same people," he said. "It was a very relaxed atmosphere. If I had moved around a lot, I don't know what would've happened. It might have affected me differently."

In many cases, stutterers have difficulty leading normal lives. Those with severe problems have trouble talking by telephone or introducing themselves

to strangers. Every word and every sentence is a struggle.

Said Sibille: "That's true. The hardest thing is to answer the phone and say your own name. Well, it's easy to say your name, but when somebody asks you, it's tough. I build up a lot of pressure. You wait for somebody to ask you something and when your turn comes up, you think, 'Oh Lordie, now I have to answer.'"

His stuttering is a handicap, but it hasn't stopped him from performing his job. You don't talk much when you're aboard a mount. But it does cause problems when socializing, although Sibille is quite popular.

"He's a delight to be around and a joy to talk to," said Kathi Corrandini, who, along with husband Rick, a horse owner, often go out with the Sibilles. "All you have to do is wait on his answer a little."

What's particularly tough for Sibille is television interviews.


"In the past I wouldn't do interviews," he said. "I would talk to the newspaper guys, but not TV guys. I just wouldn't feel right doing it."

Knowing that being interviewed is

part of an athlete's life, Sibille began using a device called the Edinburgh Masker, which helps a stutterer speak more fluently. It's a voice-activated box that is attached to the base of his neck and has two earphones. When Sibille talks, he hears a noise through the earphones rather than his own speech.

"When I talk and don't hear myself talking, I don't stutter," Sibille said. "A lot of people have these things (maskers) but I hardly wear mine. It's hard to wear it in the morning when I'm riding (during workouts) and I can't wear it during the races."

"But when I lived in Chicago, I used to wear it when I'd go on a TV show or do interviews before a big stakes race. My speech would be perfect. I think that (device) would be perfect for a businessman because you could cover it up with a tie and no one in the office would know."

But Sibille gets along well without his masker. He's doing what he's always wanted to do—riding race horses—and doing it well. And during his off hours, he's got his dish. What more could he ask for? 



# TURNER



**Tuning In CNN** - An Italian first as technician homes dish in on Intelsat VA-F11.

**S**eptember 30, 1985 was an historic day in the annals of European satellite television for, on that day, the Turner Broadcasting Corporation launched its Cable News Network service in Europe. At a large reception which I attended in the luxurious ballroom of London's swank Dorchester Hotel crowded with representatives of the press and the cable TV, broadcasting and hotel industries, CNN demonstrated the downlink of their European service on a host of TV monitors. They then switched to a direct split-screen feed with Ted Turner in Atlanta speaking to representatives of Turner Broadcasting in London. The entire ceremony was shown on CNN live in the U.S. and simultaneously to CNN Europe viewers in the Dorchester, the first hotel in Europe to make the service available free-to-the-guest in all its rooms. The quality of the transmission was excellent off a 1.8 meter (approximately 6 foot) antenna and the double uplink/downlink made the delay in lip-synch between the speaker in London and his image on the TV screens after the 100,000 mile trip very obvious.

The importance of the event for the

European satellite industry consisted in the fact that the CNN programming can be received over an area stretching from Scotland and Scandinavia in the north to the African coast in the south and from Ireland and Portugal in the west to Germany and Greece in the east. Depending on the relative distance from the footprint's boresight, dishes in the 4 to 10 foot range can give crystal-clear reception. This means that not only private individuals such as U.S. businessmen, diplomats and military personnel residing in Europe but also all European hotels can now receive, inexpensively, 24-hour-a-day news directly from the U.S. If one calculates that 50% of the guests in European luxury hotels are American or English-speaking one can appreciate the importance of being able to receive timely news programs in an understandable language. The value of this amenity to a European hotel far outweighs the importance of HBO to a U.S. hotel or motel.

I attended the London reception at the invitation of Henry Gillespie, Chairman of Turner Program Services. My wife and I were on vacation in Italy during this period and had ren-

ted a small house outside Florence. I thought that it would be fun to see what I could receive on a six-foot Stolle dish which my friends at Alcoa had been kind enough to ship me. I borrowed the Luxor-manufactured electronics from some Italian friends in the satellite equipment distribution business. And so, on a beautiful Saturday morning we started to put the equipment together much to the incredulity of my wife, Marina, who had thought that we were taking a vacation away from the satellite industry and not taking the industry with us. My Italian friends and I quickly found the first satellite we were looking for, Eutelsat I-F1 at 13° East Longitude almost directly to the south of us and about 44° above the horizon. This is the satellite that carries most of the European entertainment programming including Music Box which is the British equivalent of MTV, the Italian state TV network RAI 1, as well as various types of programming from France, Germany, Belgium, Norway and the Netherlands. All of these programs are transmitted in the frequency range of 10.95 to 11.75 Gigahertz which is then block downconverted to 900 to 1,700 Megahertz. These signals are watchable on any standard home satellite receiver sold in the U.S. with the difference that our bandwidth is only 500 Megahertz (900-1,400) while the European is 800 Megahertz wide. That means that a standard, unmodified U.S. receiver will only "see" a portion of the European bandwidth.

Flushed with the success in finding the Eutelsat bird, we set about looking

*Continued on page 76*

**At The Controls** - Ted Turner at CNN central. CNN can now be seen from Scotland and Scandinavia in the north to the coast of Africa, from Ireland to Germany and Greece. Europeans have been hailing the satellite network as a major development in comprehensive news coverage.





## NEW LAUNCHES Additions To The TVRO Marketplace

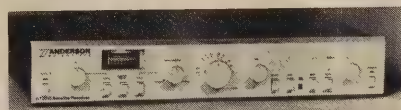
TV	TV	GROUND COMMON	GROUND COMMON
TVRO	TVRO	WEST	WEST
SWITCH	SWITCH	EAST	EAST
SPLITTER	SPLITTER	ANTENNA POSITION SENSOR +	ANTENNA POSITION SENSOR +
AUDIO LEFT	AUDIO LEFT	TO	TO
LNA LNB LNC	LNA LNB LNC	FROM	FROM
POLARIZER +6 OR +9 VOLTS	POLARIZER +6 OR +9 VOLTS	ANTENNA DRIVE MOTOR -	ANTENNA DRIVE MOTOR -

**Travelers Companion** While technically this isn't a brand new product, it's so unusual that we felt it was worth drawing our readers' attention to. From TOKI of Woodland Hills, California, this is truly a go-anywhere satellite system. The dish opens and closes like an umbrella. When open it expands to a 5-1/2 foot system. Everything but the receiver fits into a carrying case that only weighs 45 pounds.

We're sure readers are wondering how such an umbrella system can hold the parabolic curve needed for satellite TV reception. Rest assured, we've seen it in operation and it does work. You can get further information at (800) 362-3621.



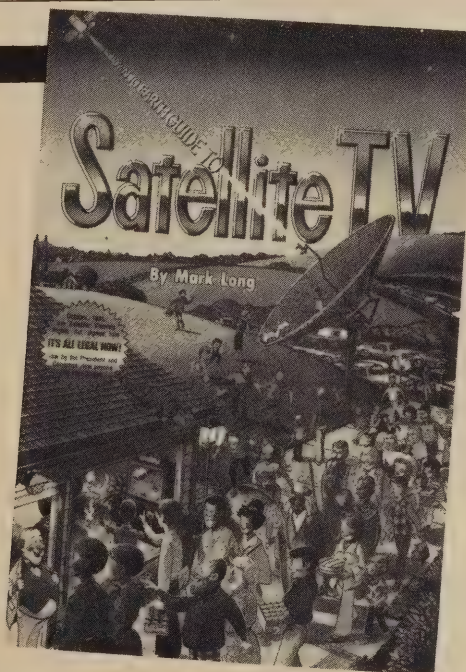
**Label It!** Ever have trouble remembering what a dial did or where a wire led? This unusual product solves your problems. It consists of self-adhesive labels for virtually every possible dial, wire and component of your system. Just locate the item you want identified (splitter, VHF, Block Converter, To/From etc.), peel off the label and attach. It's really useful if you have a lot of equipment and more than one user. Available for \$3.95 from Com/Way Satellite Systems, Box 1729, Alamogordo, N.M. 88310.



**Receiver** The Anderson Scientific ST2010 offers many features including optional remote, continuous tuning and block down capacity. In addition, it has channel scan mode and variable band control. The LNA power supply is built in and as an option has an electronic HB switch.

**Fighting TI** If you have a problem with Terrestrial Interference, consider this booklet from MFC Corp. Information in the book is helpful in selecting filters to alleviate non-destructive TI.

The booklet is *free* and is intended to be handed out by dealers. If your local dealer doesn't have one contact MFC at 6743 Kinne St., East Syracuse, N.Y. 13057 or call (800) 448-1666.



### Bookshelf The Bookshelf The Bookshelf

Space Satellites and their receiving dishes are proving a common denominator in a world that exists in a state of disparity. Communication, particularly on such a high level, is the answer to centuries of searching.

Mark Long's new book, "The Down to Earth Guide to Satellite TV," is a primer in a new industry. Answers are here, to almost any question. You will appreciate this guide to how it all works now and what will follow in the future. Programming is almost unlimited and the great super stations are discussed as well as the channels available exclusively through satellite.

This well-illustrated book will teach you what you must know to stay in touch with the future—because as you will see —"the future is NOW."

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# THE HOME SATELLITE STORY

## *A Newcomer's Guide To The Television Revolution*

**TV** signals from space, direct to the TV set in our home - when we first hear it, sounds like an idea from Buck Rogers.

But, in fact, it's the story of the future happening in the present. With nearly a million home satellite TV receivers installed in the U.S. alone, it's not only real, it's becoming commonplace.

And it's not that hard to understand. We're all familiar with how conventional TV works. There's a local station which broadcasts a signal. The signal travels directly to an antenna placed on our roof, carried down by a wire to our TV set where we view it.


The limitation is that the signal rarely travels more than 50 miles, restricting the number of stations we can watch. Cable usually is an improvement. A cable operator receives both direct signals such as described as well as signals of many distant stations sent either by microwave or satellite. These then are sent to our home via cable connections.

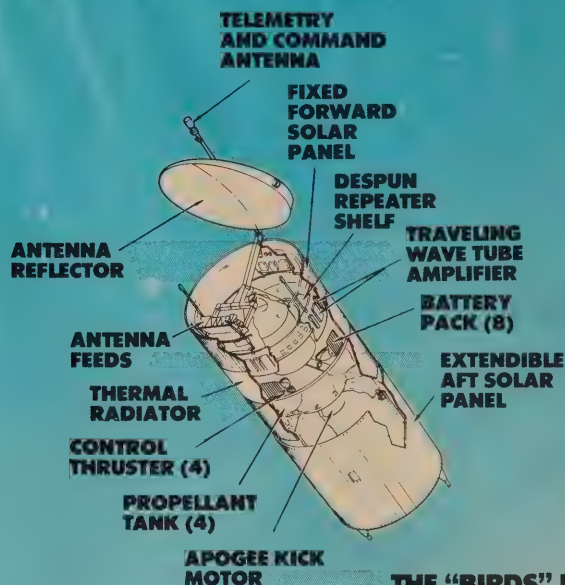
Satellite TV works best of all. With Satellite TV, we bypass the cable operator. We set up a dish antenna in our yard which receives TV signals directly from satellites out in space. (Remarkable as it may seem, these satellites are stationary relative to the earth, so it's fairly simple to aim a dish at them and keep them in "focus.")

Powerful TV stations send the signals to the satellite (called "uplinking"). The satellites receive them, then rebroadcast the signals back down to the earth. Because of their height, the signals, though weak, can cover an entire continent (the area of the earth the signal hits is called its "foot-print").

That's why, no matter where we may be in the United States, when we aim a dish antenna at the satellites (there are currently 18 domestic "birds" in orbit) we can expect to get many signals or channels.

Once we've set up an antenna and are receiving a signal, it's piped to our house through wiring and then to a special receiver which allows us to view it on our TV set.

We can receive 24 channels per satellite (though all are not currently working or are not devoted to TV) and by moving our dish horizon to horizon, pick up other signals from other birds. Currently that means over 117 channels! 



### THE "BIRDS" IN SPACE

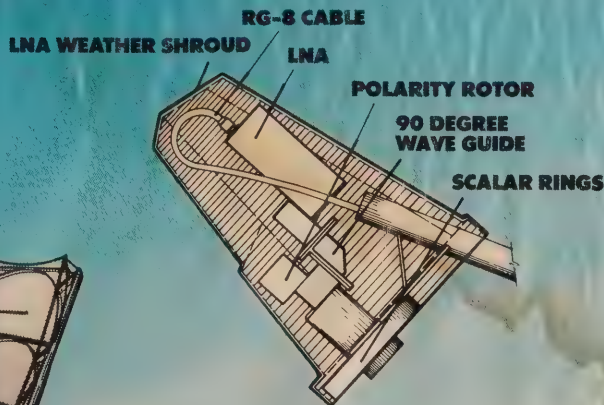
Arthur C. Clarke (2001: A Space Odyssey and 2010: Odyssey Two) first surmised that a satellite could be launched into an equatorial orbit where the pull of gravity would just be offset by the speed of the vehicle. From earth, the satellite would appear to "hang suspended" without moving, 22,300 miles high. From such an altitude a TV signal broadcast down could cover enormous areas such as the entire United States.



### FROM BROADCASTER TO SATELLITE

It's called "uplinking" and refers to the signal sent from a powerful TV station to a satellite. The "bird" receives the signal, then rebroadcasts it to you.

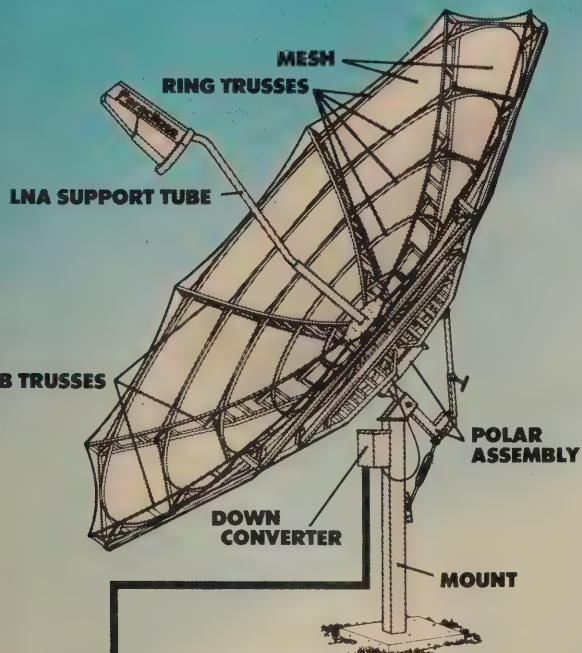




### TUNED FEEDHORN ASSEMBLY

The LNA (Low Noise Amplifier), suspended at the center of your antenna, enormously amplifies the minute signal. Its power is measured by how little "noise" it adds. The lower the noise of the LNA, the better.

Illustrations courtesy of Paraclipse Corp.



### YOUR ANTENNA

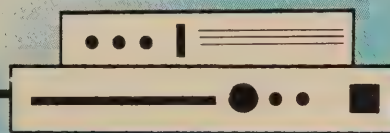
A parabolic reflector that you set up in your back yard. It's not the actual antenna, it just captures the signal and focuses at its center. The antenna is a tiny device at the center with an amplifier.

### SATELLITE RECEIVER

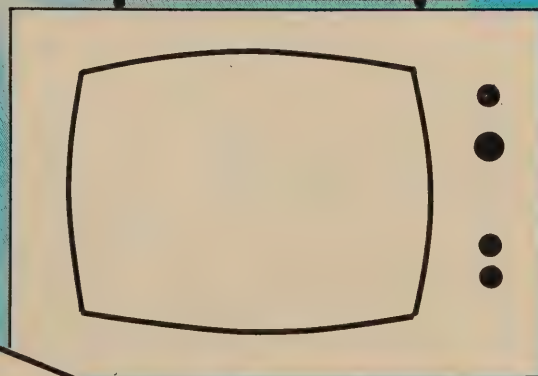
You need a special receiver to "translate" the satellite signal before you can see it. The receiver connects on-line before your TV.

### ANTENNA POSITIONER

The latest luxury of satellite reception is the controller that activates a motor drive on your dish. A quick change of satellite is managed from within.



## PRIVATE EARTH STATION COMPONENTS



### THE PICTURE

At the end of a satellite system, you can use any TV designed to be played in the United States. No special set required.

### THE REMOTE

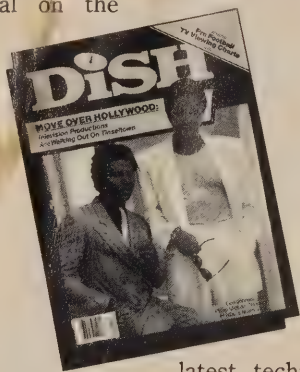
Most top line receivers offer a remote control. It should control both the receiver and the TV.





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HST1

## COOP'S WORLD OF SATELLITES

Continued from page 12

Hurricane Kate was a mean storm. The winds pounded our north shore location at more than 75 miles per hour for more than nine hours. There was a 90-minute break as the hurricane eye moved directly overhead. During the time the eye was passing through, mild 20-30 mile breezes persisted. Then the "back" side of Kate hit. The force of the backside of the storm, in theory no greater than the front, was awesome. All of the dishes had been pounded by the storm's leading edge from "the rear". The winds had worked the dish surfaces over across the back side. Metal parts were fatigued, and some mounts had broken loose. But a 4 a.m. inspection with flashlights revealed that most of the antennas could have been salvaged at that point. The backside of Kate would finish the destructive job.

The rear surface winds had worked primarily at the dish mounts. The huge "antenna sails" had been battered and the bolts and steel that held the antennas in position had strained under the tremendous loads. Marshall Foiles and John Ramsey had attempted to retighten bolts during the "eye" visit. When the backside hit, the winds jumped from 20 miles per hour to over 100 in just seconds. Now the winds were blowing directly into the mouth of the dishes and the tremendous forces exerted snapped bolts and ripped huge pieces of steel out of the ground. Large chunks of concrete lifted out of the ground and broke loose. A 16-foot (USS) fiberglass dish ripped out of its sizable concrete pad and whipped backwards driven by 100 mile winds. The fiberglass dish beat itself to death on the concrete pad freying the massive fiberglass pieces into shreds.

The backside winds pounded the dishes for four and one half hours. When the winds would finally diminish to below 75 miles per hour, and a man could once again walk upright without assistance, pieces of antennas were scattered over several dozen acres. Provo was without television. The entire Turks and Caicos Islands was without television, or radio, or communications. It would be weeks before the damage was repaired enough to restore the basic before-Kate communications.

I have prided our Turks and Caicos installation as a "real world" test bed

for all types of basic and sophisticated testing. Hundreds, perhaps thousands of tests have been conducted here to evaluate the operational performance of antennas, receivers, LNAs and every other conceivable part one finds in a (home or commercial) TVRO system. None of the tests were as severe nor as revealing as Hurricane Kate.

If I was previously skeptical about mesh dish claims for their ability to stand up to hurricane force winds, Kate cleared up that skepticism. If I previously judged metal antennas by the "stoutness" of their surfaces, I now confess that while surface is important for electrical performance, mounts are far more important. Our solid antennas failed not because of (reflective) surface failures, but because the steel beneath the antennas was poorly selected or poorly formed or poorly assembled. Our fiberglass antennas failed for the very same reason. In fact, more than one fiberglass antenna with inferior electrical (signal gathering) properties survived surface-intact because the surface was structurally adequate to withstand the tremendous loads. The message here is clear, at least to me:

- 1) *Paraclipse antennas are unusually strong.* A Paraclipse antenna equipped with a horizon to horizon mount is the strongest of the strong.
- 2) Sixteen and 20-foot antennas, of any brand now sold in the TVRO field (except the Paraclipse 16 footer) are not capable of handling hurricane force winds. Period. The mounts simply will not absorb and take the strains associated with such a storm.
- 3) Mounts, especially pipe mounts, are the weakest link in a dish installation. Every 3½" pipe mount we had came apart (bent over or broke); even those with eight and nine foot antennas. Every five-inch pipe mount "made it" and we lost about half of those with 4 and 4½" pipe mounts.

A 100-mile plus hurricane is the near ultimate "testing ground" for TVRO antennas. The last such storm to strike the Turks and Caicos islands was back in 1960. Now that we have had our test, I will expect the next such test before 2010. ♣



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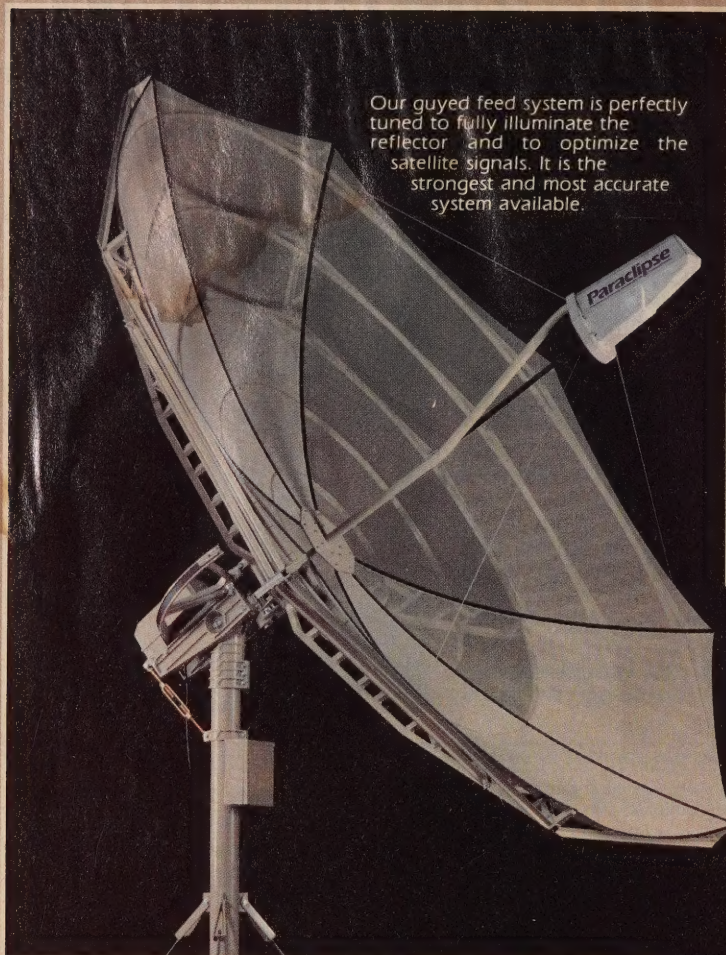
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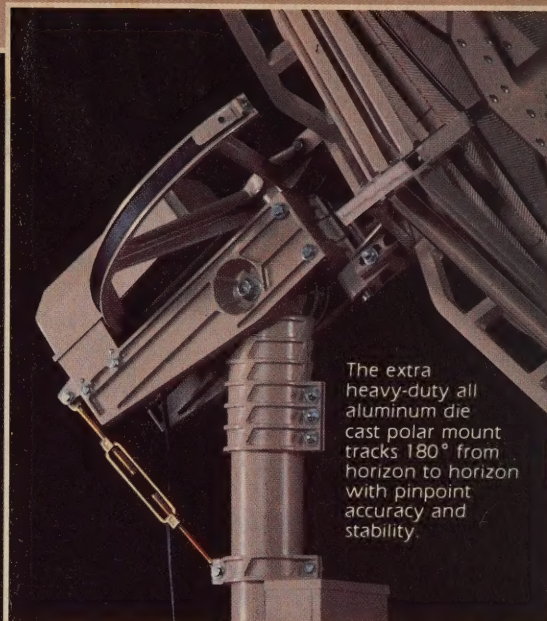


# Paracclipse CD

Our new **Cog Drive** system eliminates most of the service problems you get with a linear actuator. No more slop in the azimuth control. No more worn out acme nuts. No more motors full of water.



Our guyed feed system is perfectly tuned to fully illuminate the reflector and to optimize the satellite signals. It is the strongest and most accurate system available.

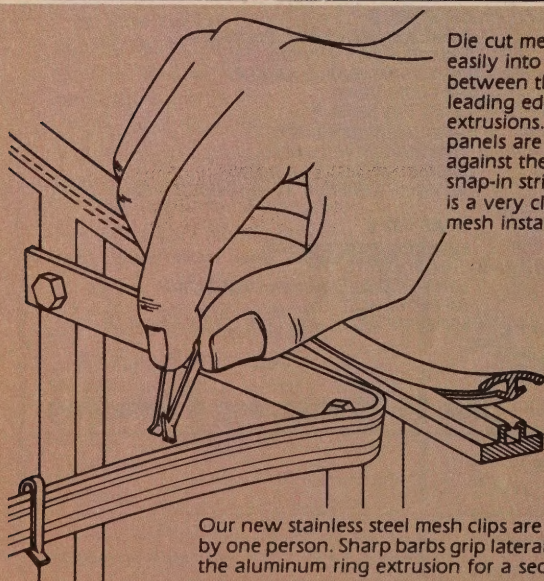


The extra heavy-duty all aluminum die cast polar mount tracks 180° from horizon to horizon with pinpoint accuracy and stability.

**RIGIDITY** For an antenna to produce a sharp, clean picture it has to maintain a very high degree of parabolic symmetry. The structural integrity of any antenna design will greatly influence its gain and beamwidth characteristics. Strength is critical for good performance.

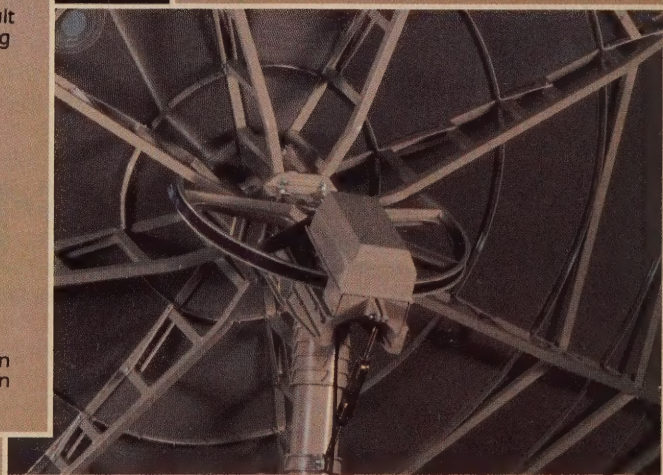
**ACCURACY** In addition to a perfectly shaped reflector, you must be able to aim the antenna with predictable, repeatable precision. A stable, accurate polar mount and drive system will enable you to enjoy truly care-free operation of your system.

**ENDURANCE** You'll want an antenna system that performs without excuses. You'll want that same performance tomorrow as well as years from tomorrow. Start with a high performance Paracclipse system and that's what you'll get.



Die cut mesh panels fit easily into place between the new leading edge rib extrusions. The mesh panels are held firmly against the rib by a snap-in strip. The result is a very clean looking mesh installation.

Our new stainless steel mesh clips are snapped on by one person. Sharp barbs grip lateral grooves on the aluminum ring extrusion for a secure hold.



## Paracclipse

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